

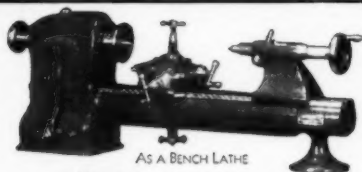
HITCHCOCK'S *Machine Tool* BLUE BOOK

FOUNDED

SEPTEMBER 1938

1905

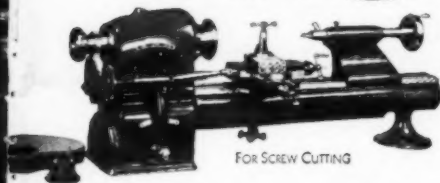
HARDINGE PRECISION BENCH LATHES
MEET VARYING REQUIREMENTS



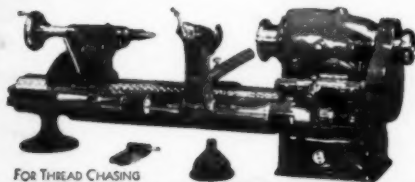
AS A BENCH LATHE



AS A HAND SCREW MACHINE



FOR SCREW CUTTING



FOR THREAD CHASING

Start with HARDINGE and have the possibility of many machines at your disposal.

A HARDINGE Bench Lathe is originally arranged to permit a great variety of operations through the addition of available attachments. Illustrations show a few of the variations.

There are five sizes for your selection— $\frac{1}{2}$ " to 1" collet capacity, 7" and 9" swing.

SEND QUICKMAIL COUPON No. 1
FOR FULL DETAILS.

FOR GRINDING



HARDINGE BROTHERS, INC., - - - **ELMIRA, N. Y.**
CHICAGO—NEW YORK—PHILADELPHIA—DETROIT—HARTFORD—CLEVELAND
PRECISION MACHINE TOOLS SINCE 1890

PUBLISHED AT 508 SO. DEARBORN ST., CHICAGO

MARVEL SAWS

The Saw "With 100 Uses" ... UNIVERSAL

Usually the busiest machine tool in any shop because it's universal—handles all sizes and does all things well. Straight cutting. Any stock from $\frac{1}{2}$ "x $\frac{1}{4}$ " to 18"x18".

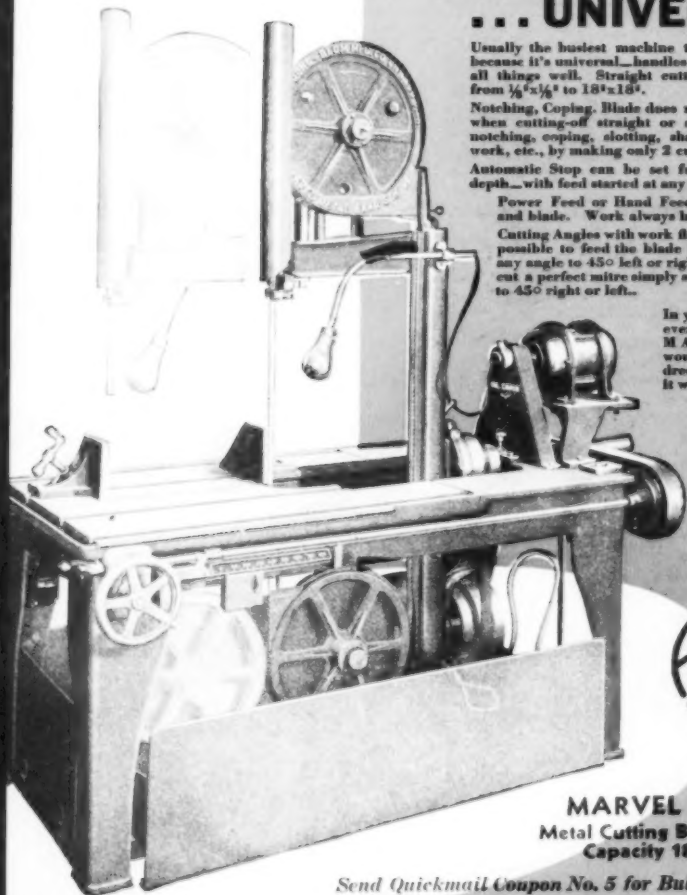
Notching, Coping. Blade does not change angle when cutting-off straight or square. Permits notching, coping, slotting, shanking dies, jig work, etc., by making only 2 cuts.

Automatic Stop can be set for any required depth—with feed started at any point.

Power Feed or Hand Feed moves carriage and blade. Work always held stationary.

Cutting Angles with work flat on the bed it is possible to feed the blade into the work at any angle to 45° left or right. Example: to cut a perfect mitre simply swing the upright to 45° right or left.

In your shop, whatever your work, the MARVEL No. 8 would find "a hundred uses" on which it would cut costs.



MARVEL No. 8
Metal Cutting Band Saw
Capacity 18"x18"

Send Quickmail Coupon No. 5 for Bulletin 800-A

ARMSTRONG-BLUM MFG. CO. "The Hack Saw People" CHICAGO





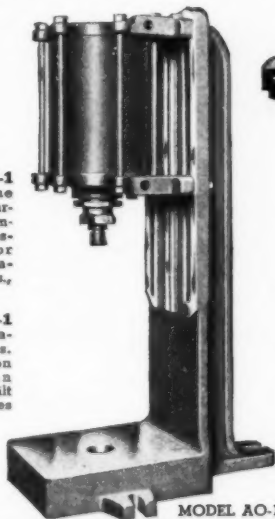
HANNIFIN

AIR OPERATED ARBOR PRESSES

For assembling, broaching, piercing, keyway cutting, oil grooving, straightening, pressing, molding, and many similar production operations



MODEL BO-1



MODEL AO-1

● **MODEL BO-1** semi-steel frame ratio arm type arbor press. A compact, high pressure press for small work. Capacity 10,980 lbs., stroke 1 inch.

● **MODEL AO-1** arbor press. Capacity 2,650 lbs. Cylinder position adjustable in frame. Also built in other capacities

These Hannifin presses are equipped with the Hannifin improved air cylinder, having outside adjustment of the piston packing. High efficiency operation is easily maintained throughout the entire life of the piston packing.

Cylinder bores are ground and honed. Perfect piston fit in a mirror-finish bore means maximum power and elimination of leakage troubles.

Hannifin Arbor Presses are available in a full range of types and sizes, capacities 600 lbs. to 50,000 lbs. They can be furnished with the Hannifin patented oil cylinder speed control where a steady, controlled ram stroke is required. Write for recommendations.

Write for Bulletin 36-H.
Use Quickmail Coupon No. 47.

HANNIFIN MANUFACTURING COMPANY • 621-631 SOUTH KOLMAR AVENUE • CHICAGO, ILLINOIS
ENGINEERS • DESIGNERS • MANUFACTURERS • Pneumatic and Hydraulic Production Tool Equipment

Spring tempered COLLETS

Order From Stock

Scientifically heat treated to a true spring temper, "Rivett Mark" collets resist wear and hold their spring longer than collets of any other make. As standard equipment on all makes of lathes and millers, (see Rivett Bulletin 100B) they may be ordered for immediate delivery from the following stocks:—

CHICAGO

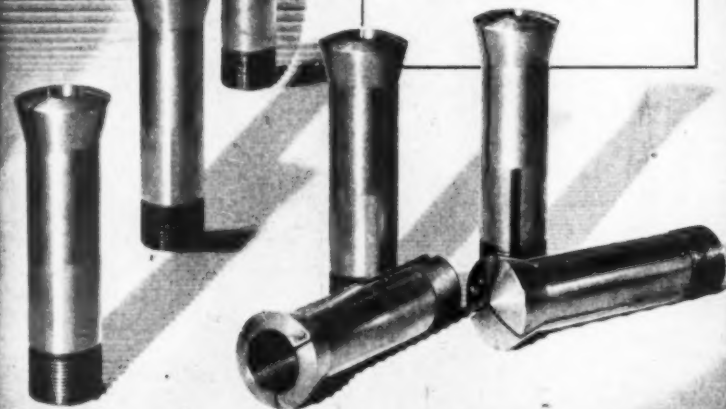
R. E. Ellis Engineering Co.
565 W. Washington Blvd.

DETROIT

Charles A. Strelinger Co.
149 E. Larned Street

BOSTON

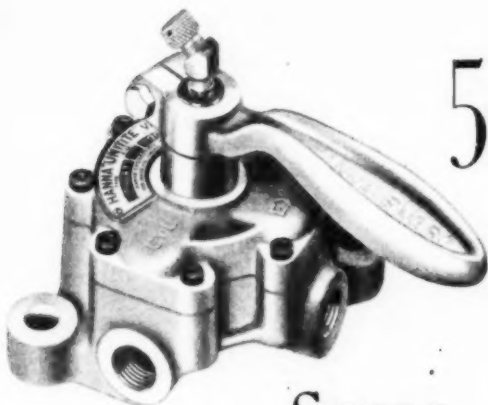
Rivett Lathe & Grinder Inc.
18 Riverview Road, Brighton



RIVETT

LATHE & GRINDER INC.
BRIGHTON, BOSTON, MASS.

Send Quickmail Coupon No. 24 for Bulletin 100-B



500,000 TURNS *and* STILL TIGHT



Because the two piece design of valve stem and disc permits the valve disc to find its own seat with each operation continually improving seating surfaces.

HANNA UNITITE VALVES

are packless, easy to operate and deliver line pressure to the power unit instantly and efficiently. You can benefit from their advantages at no extra cost — in fact prices applying for all sizes are unusually low.

For Further Details See Catalogue 226

HANNA ENGINEERING WORKS
1765 ELSTON AVENUE
CHICAGO, ILLINOIS

Use Quickmail Coupon No. 8 when you send for catalog.

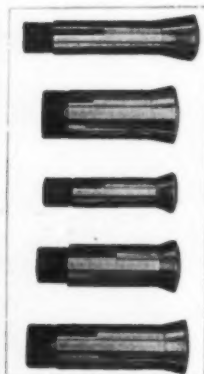
COLLETS


—IMMEDIATE SHIPMENT FROM STOCK—

Send Quickmail Coupon No. 2 For Bulletin No. 37

ALL SIZES


ALL TYPES





HARDINGE
COLLETS SINCE 1855

DRAW-IN COLLETS
FOR ALL
LATHES AND MILLERS

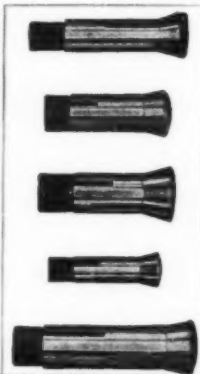


FOR
— ACCURACY —
— DURABILITY —
— ATTRACTIVE PRICES —
— SPECIFY HARDINGE COLLETS —

Refer To Inside Page For Your Requirements
Accuracy and Economy in Selections — See "To Look for Minimum Features"

Hardinge Collets are in stock for immediate delivery. Hardinge Collets embody these elements of precision which have characterized our products since 1855.

HARDINGE BROTHERS, INC., ELMIRA, NEW YORK



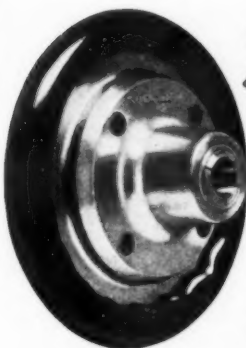
THE ABOVE COLLET DATA BULLETIN IS AVAILABLE FOR PRODUCTION, PURCHASING, STOCKROOM AND ENGINEERING DEPARTMENTS

Reasons Why Each Department Should Have a Copy:

1. Clearly shows the styles of collets adapted in your lathes and millers.
2. Lists the standard collets with general dimensions for identification.
3. Gives normal round, hexagon and square capacity of standard collets.
4. Shows how all of your lathes and millers may be adapted for collets.
5. Collet stocks in Elmira, Chicago, Detroit, Cleveland, New York, Hartford and Los Angeles.
6. Attractive prices are listed for round, hexagon and square hole sizes.

HARDINGE BROTHERS, Inc., Elmira, N. Y.

SPECIFY HARDINGE COLLETS



SJOGREN

PRONOUNCED (SHOW-GRIN)

SPEED COLLET CHUCK

For Your Tool Room and Engine Lathes

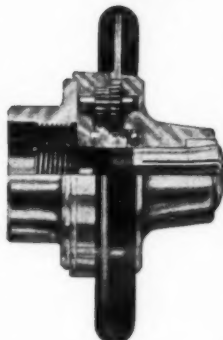
- Saves Time
- Increases Capacity
- Eliminates Keys and Wrenches
- Increases Production
- Affords Greater Accuracy
- Three sizes up to 1 3/4" Capacity

"Saves Time and Increases Accuracy"



In use on Milling Machine

In use on Engine Lathe



The amazingly fast action of the Sjogren Speed Collet Chuck gives it full right to its name! An almost effortless turn of the handwheel, one way or the other, automatically opens or closes the collet, releasing or gripping the work as desired. Its grip is adjustable and sure. Most operators simply lay a hand on the wheel and run the lathe forward to tighten the collet . . . reverse to loosen.

METHOD OF MOUNTING: An intermediate plate is used to adapt the Sjogren Speed Chuck for machines with threaded nose spindle. It is mounted in the same manner as an ordinary 3 or 4 jaw chuck. Also, it is furnished complete, ready for use with machines having standard tapered key-drive or cam lock spindles.

With the Sjogren Speed Collet Chuck, the operator is always in front of his work and he stays there! There is no need to reach over—or to walk back of the lathe headstock—to grip or release material in the collet.

Through the increased production and machinist efficiency caused by the elimination of lost time and lost motion, the Sjogren Speed Collet Chuck more than pays for itself! Write today to the nearest distributor or use Quickmail Coupon No. 3.

FURNISHED WITH HARDINGE PRECISION COLLETS

● DISTRIBUTORS ●

Ray H. Morris & Company, Inc.	7 South Main Street	West Hartford, Conn.
Hardinge Sales Company, Inc.	277 Lafayette Street	New York, New York
Wright & Gade Equipment Co.	3701 North Broad Street	Philadelphia, Pa.
Hardinge Brothers, Inc.	1418 College Ave.	Elmira, New York
W. W. Wentz	113 Powers Building	Rochester, New York
William K. Stamets	Jenkins Arcade Bldg.	Pittsburgh, Pa.
Cleveland Duplex Mch. Co., Inc.	Penton Building	Cleveland, Ohio
E. A. Kinsey Company	331-335 W. Fourth St.	Cincinnati, Ohio
Iverson & Laux	544 W. Washington Blvd.	Chicago, Illinois
F. A. Durnell	709 Carlisle Place	Indianapolis, Indiana
National Sales Engineering Corp.	2970 W. Grand Blvd.	Detroit, Michigan
Northern Machinery & Supply Co.	Lumber Exchange Bldg.	Minneapolis, Minn.
Colcord Wright Mch. & Supply Co.	1223-1229 N. Broadway	St. Louis, Missouri
C. H. Gosiger Machinery Co.	Bacon & McDonough Sts.	Dayton, Ohio
Moore Machinery Company	550 Fifth Street	San Francisco, Calif.
Eccles & Davies Machinery Co., Inc.	1910 Santa Fe Ave.	Los Angeles, Calif.

SJOGREN MANUFACTURING COMPANY



Standardized



CONGRESS DRIVES

Whatever you need in the way of drive equipment, you'll find it in the complete CONGRESS line of precision "built to the belt" pulleys and flexible couplings.

CONGRESS pulleys are diamond bored to plus or minus .0005" and are accurately balanced. They fit the belts.

CONGRESS variable pitch pulleys are ideal for air conditioning units and stokers and permit speed variations of approximately 30%. Much greater speed variation is obtainable by using both pulleys of this type and by interchanging them on motor and driven shafts.

With CONGRESS "V" step cone pulleys the center distance remains constant when changing belts, eliminating belt adjustment after each speed change.

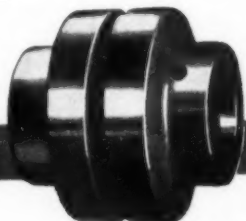
CONGRESS flexible couplings are available for direct drives of fractional H. P. motors to 25 H. P. motors.

A technical staff is always ready to offer recommendations on your transmission requirements.

Quickmail Coupon No. 57 will bring you a bulletin giving sizes, specifications and full information.

The Congress Tool & Die Co., Inc.

9042 Lumpkin Avenue
Detroit, Mich.





3 NEW SKILSAW DRILLS

for factory maintenance and general service shop work . . . priced to meet 1938 economy budgets! These new low-speed, high-torque SKILSAW Drills have that EXTRA POWER drills, yet they combine compactness, heavy duty production drills, triple speed for general service, light weight and low spindle speed for reduction, helical-cut gears of finest heat-treated steels are stronger and quieter. Ball bearings on armature and Timken tapered roller bearings on chuck spindle insure smoother operation. Use these drills in wood, with hole-saws for cutting clean holes up to 4 1/4 in. diameter.

Send Quickmail Coupon No. 27 for complete catalog.

Model 141 Special Duty
Powered for toughest drilling jobs on metals and wood. Capacity in steel 7/8 in. No-load speed 200 R.P.M. Length 19 1/2 in. Wt. 17 lbs. **\$73**

Model 121 Special Duty
No. 3 Worm taper socket. Capacity in steel 3/4 in. No-load speed 250 R.P.M. Length 18 1/4 in. Wt. 18 1/4 lbs. **\$68**

Model 101 Special Duty
With Jacobs chuck. Capacity in steel 5/8 in. No-load speed 300 R.P.M. Length 15 1/4 in. Wt. 16 1/4 lbs. **\$60**

21 MODELS

SKILSAW, INC.
Dept. A, 2114 Irving Ave., Chicago, Ill.
120 Broadway, New York
100 Water St., Boston
1000 Broadway, New York
1000 Broadway, New York
1000 Broadway, New York
1000 Broadway, New York

Higher Grade Rotary Files
at **LOWER** **TOOL-DOLLAR**
COST !!!



Ford Hand Cut Rotary Files
Pay on Every Job

Send Quickmail Coupon No. 72 for Catalog.

M. A. FORD MFG. CO.
413 Pershing Ave., Davenport, Iowa



SKILL and PRECISION

are the basis of its fine quality

KELLERFLEX

SKILLED craftsmen—the finest materials—up-to-the-minute equipment—78 years of Pratt & Whitney precision machine tool and gage experience . . . those are the facilities back of the powerful little Kellerflex Flexible Shaft Machines.

In flexible shaft equipment, accuracy, durability and efficiency are largely dependent on the construction of the handpiece. That is the piece that takes the brunt of operating shocks, yet must hold the tool absolutely true and rigid at all times.

Every part in the Kellerflex Handpiece is precision made and fitted. Multiple ball races absorb the radial load and prevent heating up at high speeds. Spindle bearing surfaces are hardened, ground and lapped. The collet seats are ground in the spindle, and collet holes and angles are precision ground to assure proper tool chucking. The entire piece is carefully designed to fit the operator's hand comfortably, reducing fatigue to a minimum. Chucking facilities are such that a wide variety of burs, rotary files, mounted points, sanding and polishing drums, grinding wheels, sand brushes, etc., can be quickly and readily put into use.

Those who have used Kellerflex machines know their durability and efficiency—a direct result of the fine workmanship and materials used in their manufacture. For full particulars write us today.

Use Quickmail Coupon No. 6

PRATT & WHITNEY
Div. Niles-Bement-Pond Co., Hartford, Conn.
Kellerflex Sales Department



"Buffalo" ANNOUNCES

an important NEW DRILL

No. 16 POWER FEED DRILL

It has been added to our large and distinguished family of drills to fill the need for a substantial positive gear drive, positive clutch type power feed for a No. 2 Morse taper drill.

There are no belts, no friction members, no fancy gadgets to get out of order.

It offers these advantages:—

- Feed engaged by feed motion handle.
- Feed disengaged by upward motion of handle.
- No adjustment required on feed.
- Feed "Take - off" full geared.
- Front reading depth dial.
- Front depth control.
- Front reading feed dial.
- Feed change may be made while machine is running.

If you need a power feed drill, get the facts on the new Buffalo No. 16. Send Quickmail Coupon No. 9 for new Bulletin 3122.

Buffalo Forge Co.

161 Mortimer St., Buffalo, N. Y.

Branch Engineering Offices in Principal Cities
Canada: Canadian Blower & Forge Co., Ltd., Kitchener, Ont.



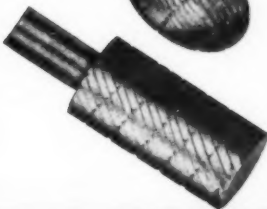
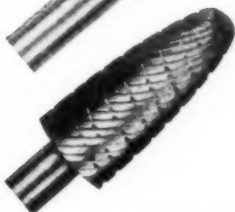
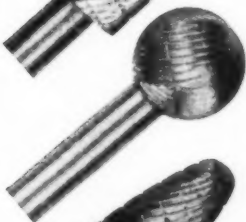
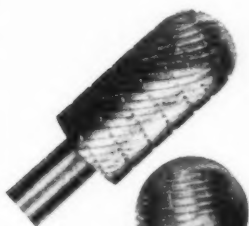
Buffalo No. 16 Power Feed Drill—Standard Floor Model.

Front view showing compactness of unit and accessibility of all controls.

JARVIS

"Ground from the Solid"

ROTARY FILES



JARVIS ROTARY FILES are ground from the solid with the head and shank in one piece.

The various shaped blanks are machined, hardened and finally the teeth are ground into the solid, hardened blanks.

Grinding from the solid after hardening makes for harder and sharper teeth—the teeth are not dulled by heat treating.

Jarvis Rotary Files may be reground many times at a fraction of their original cost, thus bringing the price of the file below the cheapest hand cut file.

Jarvis Rotary Files are perfectly balanced and true running—designed to outlast average files by several times.

THE CHARLES L. JARVIS CO.
MIDDLETOWN, CONN.



Write for new catalog showing a complete line of Jarvis Rotary Files and Flexible Shaft Equipment. Use Quickmail Coupon No. 22.

THE ONLY TAPPER WITH A LEATHER CLUTCH

Ettco - Emrick

TAPPING ATTACHMENTS

ETTCO pioneered sensitive small tapping 15 years ago with a leather lined friction driving clutch.

As yet we have found no substitute to equal the smooth, consistent super-sensitive action of leather for the exacting requirements of tapping.



ETTCO Tappers are now more powerful and sturdy and give more satisfaction than any we have ever made.

The Tappers have ball bearing spindles—needle bearing intermediate gears and all helical gears to insure the greatest possible speed.

**The Tap Idles "In"—Not Reverse—
This Means Better Holes and More Tap Life.**

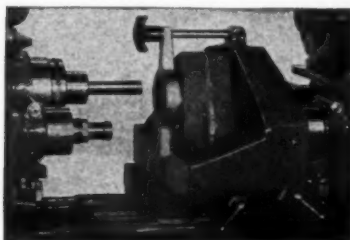
*Send Quickmail Coupon No. 35
for our catalogue.*

These tappers are used with the **ETTCO multiple tapping system** and our No. 71 **gravity foot operated tapping machine**.

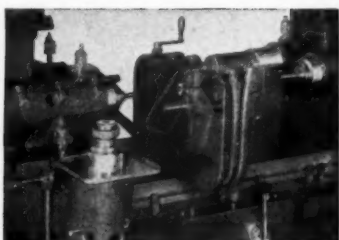
ETTCO TOOL CO.

594 JOHNSON AVE.,

BROOKLYN, N. Y.



Boring five bronze bushings in a valve housing in one set-up. Accurate alignment of holes assured.



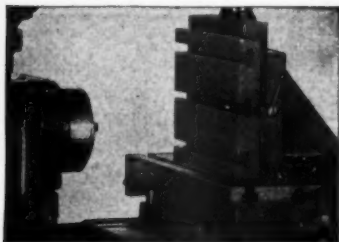
Six operations on four different refrigerator parts using five spindles on the same machine in one set-up.

FOR *Low Cost* Precision BORING

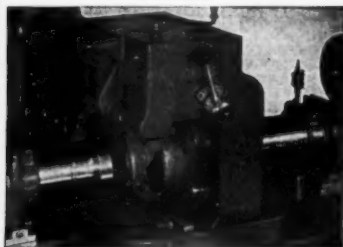
EX-CELL-O Flexibility FEATURES:

1. Standard unit construction—nine machine styles, four bridge types, twelve spindle units, and three hydraulic systems. Fixture designed to suit your parts.
2. Spindles can be mounted at any angle to the line of table travel—for taper boring or taper turning.
3. From one to four spindles can be mounted on a bridge—wide range of spindle center distances.
4. Bridges can be adjusted endwise on the machine base rails—to reduce lost time and motion in table travel.
5. Table operation is hydraulic in both directions on all machines—for boring in, or for boring out deep or blind holes.
6. Wide range of materials—cast iron, steel, aluminum, babbit, bronze, brass, etc.—can be bored, turned and faced.
7. On one machine you can handle a wide variety of parts, sizes and operations, with quickly and easily interchangeable fixtures.
8. A standard Universal Fixture enables you to handle small or experimental lots, or with a sub-fixture, medium production.

Ex-Cell-O Corp., 1188 Oakman, Blvd., Detroit, Mich.



Universal Fixture. May be mounted at an angle to or parallel with the spindle, for boring, turning and facing.



Boring the cross bores and boring and facing the pinion bore in a differential housing, from three sides simultaneously.

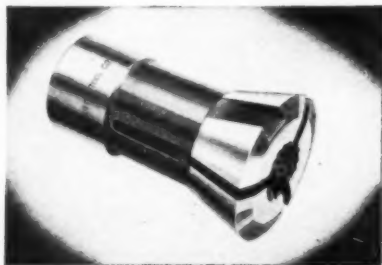
EX - CELL - O

DRILL JIG BUSHINGS, GRINDING SPINDLES, HYDRAULIC POWER UNITS, PRECISION BORING AND FACING MACHINES, PRECISION THREAD GRINDERS, COUNTERBORES, BROACHES, CARBIDE TOOL GRINDERS, CARBOLOY TIPPED TOOLS, SPECIAL HIGH PRODUCTION MACHINES, GROUND FORM TOOLS, PRECISION PARTS, MILLING CUTTERS

Send Quickmail Coupon No. 29 for further information.

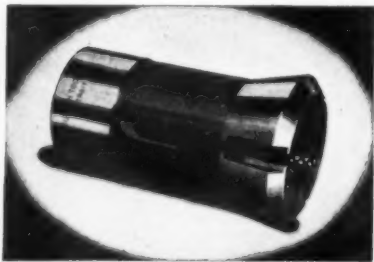
For a Sure Grip and Long Life

Sutton **DIAMOND-GRIP Collets**

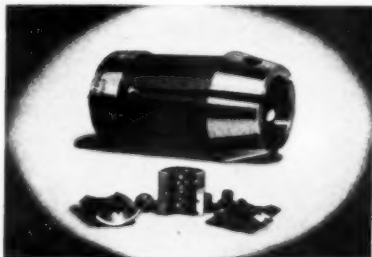


MASTER STYLE
Diamond-Grip Collets
with diamond-serrated pads

Sutton Collets furnished in single-piece and master styles for all screw machines.



DIAMOND-SERRATIONS—
grip tighter under less tension, and clear themselves of dirt and chips. The sure and positive grip of Sutton Collets reduces spoilage, and the care and skill with which they are made insure long and dependable service.



MASTER COMPENSATING
Diamond-Grip Collets
with adjustable, interchangeable, and replaceable pads.

Specially designed to grip hot-rolled stock.

COUPON 16

Will save time and bring you by return mail the complete catalog of Sutton Products

SUTTON TOOL CO. 2842 W. Grand Blvd., DETROIT, MICH.

Only Sutton Diamond-Grip Collets are Diamond-Serrated

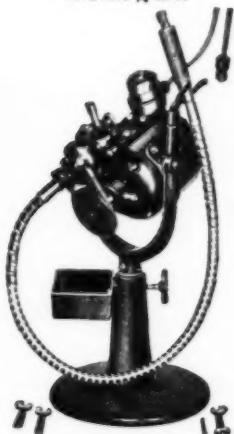
1905 *Strand* 1938

FLEXIBLE SHAFTS AND MACHINES

VERTICAL AND HORIZONTAL TYPES $\frac{1}{8}$ —TO 3 H. P. CAPACITIES

IT PAYS TO BUY HIGH QUALITY EQUIPMENT

TOOL AND DIE MAKERS MACHINE
TYPE MY4 $\frac{1}{4}$ H. P.



RIGHT ANGLE HAND PIECE



CONSTANT SPEEDS AND FULL POWER AT ALL TIMES ARE OBTAINED BY USING OUR MACHINES. CONVENIENT HANDLING AND LIGHT WEIGHT. LONG LIFE.

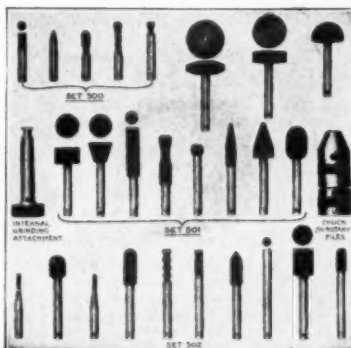
"STRAND" FLEXIBLE SHAFTS AND MACHINES ARE USED THROUGHOUT THE WORLD IN THOUSANDS OF PLANTS.

MORE THAN THIRTY-THREE YEARS IN THIS INDUSTRY.

IF YOU
PURCHASE
THE
"STRAND"
YOU GET
THE HIGHEST
QUALITY
OBTAINABLE

Send Quickmail
Coupon No. 26 for
complete catalog.

HIGH SPEED STEEL
HAND CUT — ROTARY FILES



N. A. STRAND AND COMPANY

EXCLUSIVE MANUFACTURERS

FLEXIBLE SHAFTS - MACHINES AND ATTACHMENTS

5001-5009 N. WOLCOTT AVE.

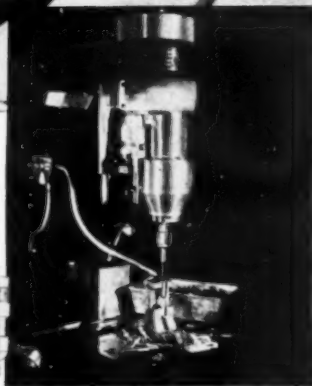
CHICAGO

**"HE'S GOT THAT
DATA YOU WANTED"**



Haskins men keep on serving long after the selling is done. Their job is not only to acquaint you with the speed and precision of the Haskins Tapper, but to be sure you obtain *all* the advantages of the Haskins Method—oils, taps and fixtures tailor-made to solve each tapping problem. We hope the Haskins man will be able to help *you*—whether he's calling for the first time or the fiftieth.

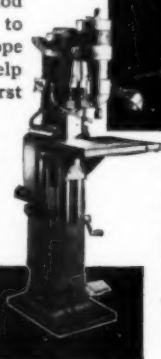
FREE—"Precision Tapping at High Speed"—many interesting applications and full details of this *new approach to the tapping problem*. Write for it, using Quickmail Coupon No. 33. R. G. Haskins Company, 4654 W. Fulton Street, Chicago.



**"SURE, YOU CAN
'TAME' MOLY"**

with your Haskins Tapper," said the Haskins man — and here's proof that he was right. This is deep hole tapping, too, where close tolerance must be maintained in the difficult-to-tap Chrome Molybdenum.

HASKINS **PRECISION**
Tapping
Equipment



WHITNEY TOOLS

MADE BY SPECIALISTS TO MEET EVERY
NEED OF PRACTICAL SHEET METAL MEN



No. 10 Ball Bearing Punch

Capacity $\frac{3}{8}$ inch through $\frac{1}{4}$ inch iron. Depth of throat $1\frac{1}{4}$ inch. Height of throat $\frac{3}{4}$ inch. Furnished with one punch in any size from $\frac{1}{8}$ to $\frac{1}{2}$ by $\frac{1}{16}$.



No. 4 Angle Iron Shear

Capacity 2"x2"x $\frac{1}{4}$ " angle iron or smaller.



Angle Mitre Notcher and Angle Iron Bender

Capacity 2"x2"x $\frac{1}{4}$ " angle iron or smaller. A pair of tools that every shop ought to have. They are Nos. 50 and 51 in our catalog.

Whitney manufactures more than 80 types of Shears, Punches and other tool equipment for metal working — dependable items perfected through long experience and close contact with the trade — tools that have "always made good."

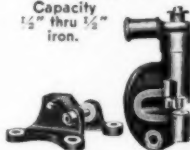


Imperial Roller Bearing Punches

—offered in 3 sizes—will work inside 90 degrees. Quick changing for punches and dies —no cams to wear—stripping action is positive.

No. 20 Ball Bearing Punch

Capacity $\frac{1}{2}$ " thru $\frac{1}{4}$ " iron.



Aircraft Rivet Squeezer

Capacity $\frac{3}{8}$ inch aluminum rivet. Spindle travel $1\frac{1}{4}$ inch. Made in 5 sizes, with throat depths from $1\frac{1}{4}$ to 6 inches.

Quickmail Coupon No. 42 will bring you the complete Whitney catalog.

WHITNEY METAL TOOL CO.
ROCKFORD, ILLINOIS



This Unusual **RIDGID** Alloy Tool - Steel Wheel - Blade Gives you



Your skill at mechanics makes it easy for you to see why this **RIDGID** Cutter with its new style wheel-blade can cut pipe more quickly and cleanly and last far longer, giving you extra economy.

For the **RIDGID** knife-like blade is coined out of fine tool steel, hammered, heat-treated and then assembled in the hub. That's what gives it the unusual stamina for hundreds of extra cuts, reducing your cutter wheel expense, as thousands of users have found.

Powerful housing, guaranteed warp-proof, always cuts true, twirls easily to your pipe size. You like the "feel" of this tool, enjoy working with it.

For time and expense saving and a tool you get a "kick" out of owning and using, buy the **RIDGID** Cutter — at your Supply House.



The Ridge Tool Co., Elyria, Ohio

RIDGID PIPE TOOLS



**Stop 75% of your pipe wrench
repairs with this famous**

RIDGID

That guarantee is your assurance that you won't have any expense for wrench housing repairs — nor the annoyance of wrenches out of commission.

Buy from your Supply House.

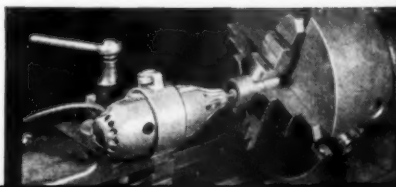
**MORE POWER
LONGER LIFE-
in DURO'S
STREAMLINE
HIGH SPEED
Grinder**



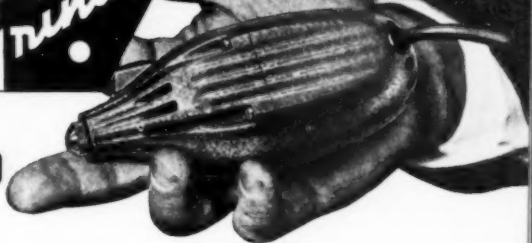
**MOTOR
POWERED**

\$14⁹⁵

AT CHICAGO



**24 000 R.P.M.
OVER 40 WATT
POWER OUTPUT**



Duro's new Heavy Duty Grinder has been specially designed for production use in the tool room or shop. It has the power, speed, precision and durability for the most exacting service. The statically and dynamically balanced motor, accurately mounted on precision ball bearings, is enclosed in a machined alloy metal housing to form a sturdy, rigid and vibration free unit. Compare these specifications with those of any grinder on the market selling up to \$35

General Electric Universal Motor series wound with over 40 watt output and running at 24000 R.P.M. Square cartridge type brushes ride on periphery of commutator. Underwriter approved continuous rotary switch. Three wire rubber covered cord. Extra wide, permanently sealed, New Departure Precision Ball Bearings. Propellor type fan. Machined rabbett fit on housing. $\frac{3}{32}$ " and $\frac{1}{8}$ " collet chuck. Chuck lock. Streamline design. Priced for 110 vol 60 cycle or less, AC or DC. 220 volts supplied at a small additional charge.

Send Quickmail Coupon No. 71 for detailed information.

DURO METAL PRODUCTS CO.,

DEPT. A 2651 N. KILDARE AVE.
CHICAGO, ILLINOIS



Conway

Means--

EASY
ENGAGEMENT
INSTANT RELEASE
DRAGFREE IDLING
ABUNDANCE
OF POWER



More than that, CONWAY stands for simplified construction with fewer parts (all enclosed); perfect balance; centripetal action; dependable performance over long periods of service.

There are no if's, ands and buts when you install CONWAY Clutches. They're engineered for the job by Clutch specialists—there's a type and size for your specific requirements—and when you install CONWAY you can be certain of highly satisfactory Clutch performance.

Send for details on your Clutch needs—let CONWAY Engineers submit recommendations for the Clutch equipment you need. No obligation on your part.

Send Quickmail Coupon No. 23 for Bulletins P-20 and L-28 covering the type illustrated above.

THE CONWAY CLUTCH CO.

1541 QUEEN CITY AVE., CINCINNATI, OHIO

These Big Pigs Went to Market..

(and gave someone a brand new idea)

Discovered — a faster, better and more economical way to clean pig snouts. Discovered — another money-saving use for Haskins Flexible Shaft Equipment.

Before You Say "SO WHAT"

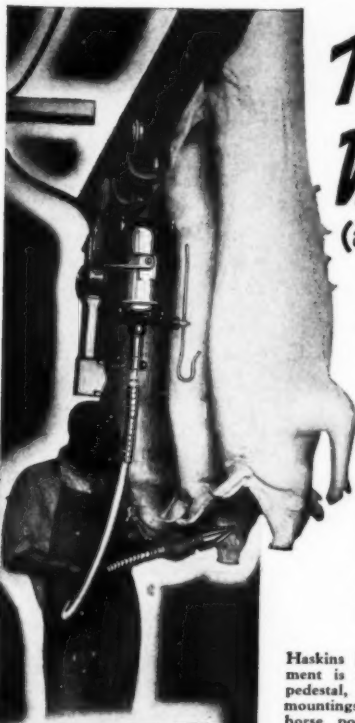
Haskins Flexible Shaft Equipment is not made specially to clean pig snouts. It is made to be just what it is—the most adaptable, the most rugged, the most all around useful equipment of its kind. With it some job in your plant can be done faster at less cost. Why not investigate? Send Quickmail Coupon No. 65 for booklet showing many flexible shaft applications and types of equipment. R. G. Haskins Company, 4654 W. Fulton Street, Chicago.

Haskins Flexible Shaft Equipment is available with bench, pedestal, truck and suspension mountings with attachments and horse power to fit the job. Among its many features: armored 7-ply casings with patented removable ends, specially designed cores, Timken and ball bearing construction, motors with great reserve power.

Versatile is the word for Haskins Flexible Shaft Equipment. Here it is at work finishing a drop forge die.



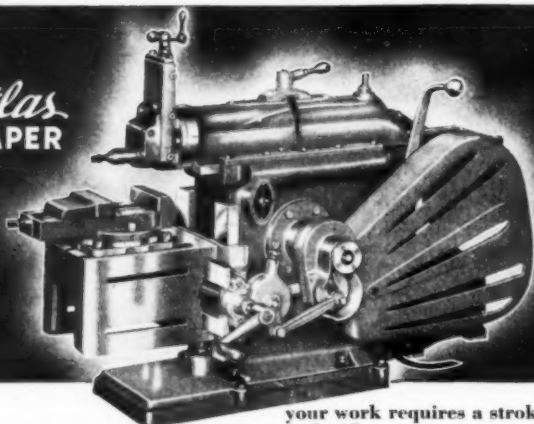
H5-4
Equipment
1/2 HP
motor,
Timken
Bearing
counter-
shaft,
6 speeds



HASKINS

Versatile
**FLEXIBLE SHAFT
EQUIPMENT**

THE Atlas SHAPER



Are you operating a large shaper for small jobs—tying up a big investment and paying high costs for set-up and operation—when the greater portion of

your work requires a stroke of 7 inches or less?

This new Atlas will handle such jobs quickly, easily, and economically. It's compact—it's easy to set up and get in motion—it's fast, powerful and accurate. The initial investment is extremely low and the ½ HP motor keeps operating costs at a minimum.

Over two years were spent in designing the Atlas Shaper, selecting the materials for its construction, and testing it in operation. The result is a machine tool with all of the accuracy, power, strength, and versatility of larger shapers built down to scale for greater efficiency on small work.

We believe you will find many ways to put this new economical shaper profitably at work in your plant, either in the tool room or on production work where shaping is indicated. Send Coupon No. 17 for Shaper Catalog No. 30.

EXTRA!
EXTRA!



OUT SOON!
NEW 1939
Atlas CATALOG
FEATURING THE LATEST
IN
METAL & WOODWORKING
LATHES · DRILL PRESSES
ARBOR PRESSES · SHAPERS
TOOLS & ATTACHMENTS

RESERVE YOUR COPY NOW!



ATLAS PRESS CO.

CHICAGO—35 E. Wacker at Wabash

PHILADELPHIA—113 N. Third St.

950 N. Pitcher St.

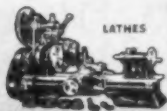
Kalamazoo, Mich., U.S.A.

NEW YORK—130 W. 42nd St.

ARBOR
PRESSES



LATHES



DRILL PRESSES



SHAPER



DRILL GRINDING
ATTACHMENT





Grinding excess weld with a MALL $\frac{3}{4}$ H. P. dustproof grinder.

You Can Do Better Work—Faster— with *Mall* Flexible Shaft Grinders!

NOTE THESE TIME AND LABOR SAVING FEATURES

Two to three times the amount of power in the operator's hands.

Constant speed, aluminum frame, ball bearing motors.

The operator carries the minimum of weight—he does not carry the motor.

The same power unit can be used for all YOUR jobs—sanding, grinding, polishing or wire brushing.

MALL Grinders are built for long life, trouble-free operation.

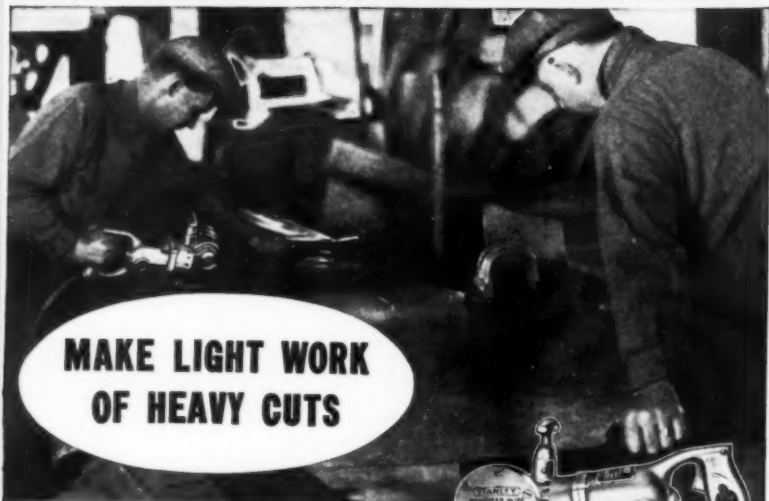
An investigation will in no way obligate you. Complete details and prices on the various models will be sent on request. Use Quickmail Coupon No. 56.

Mall Tool Company

7742 SOUTH CHICAGO AVENUE

CHICAGO, ILL.

STANLEY UNISHEARS



**MAKE LIGHT WORK
OF HEAVY CUTS**

Making bus bodies presents plenty of cutting problems — light body sheets — special trim — heavy steel plate. But here is the solution — a Stanley No. 144A Portable Unishear and a Stanley No. A10 Bench Unishear teamed together for production efficiency.

Unishears cut as fast as you feed — no distortion — no waste of metal. Any pattern — curves — angles — notches. Hairline accuracy, 100% safe for the operator.

Ask your Stanley distributor for a free demonstration. See what Unishear can do for you. Catalog 64M describes Unishears and other time and money saving Stanley Electric Tools.



PORTABLE UNISHEARS

—three sizes to cut 18, 16 or 12 gauge hot rolled steel. Cut sheet materials in the shop or on the job.

STATIONARY UNISHEARS

—floor, bench and pedestal machines—five sizes to cut up to 1/4" boiler plate. Cut any shape—and leave smooth, finished edges.

STANLEY ELECTRIC TOOL DIVISION, The Stanley Works, New Britain, Conn.

STANLEY UNISHEARS

THE ELECTRICALLY DRIVEN HAND SHEARS

PROCUNIER

HIGH SPEED TAPPERS

DESIGNED TO GIVE

GREATER VALUE

PROCUNIER high speed tapping heads will handle your tapping jobs more economically and accurately. They will increase your production and practically eliminate tap breakage. For the greatest tapping head value see the new PROCUNIER, for only PROCUNIER has **all** these features:

Dry, double-cone friction clutch that won't wear out and can't absorb oil; makes bottom tapping easy TRU-GRIP Tap holder, the most practical tap holder that ever held a tap; smallest, lightest, most accurate Ball Bearings Three-point balanced heat treated gear reversing mechanism which distributes pull through three gears, greatly reducing strain.



PROCUNIER high speed tapping heads are designed to fit your tapping needs. Write for this new folder No. 438 for full particulars. Use Quickmail Coupon No. 11.



PROCUNIER SAFETY CHUCK CO.
 14 S. CLINTON ST., CHICAGO, ILL.

SAVE POWER COSTS

With the **TURNER**

UNI-DRIVE

**THE MOTORIZING UNIT WITH FOUR-SPEED
SELECTIVE SLIDING GEAR TRANSMISSION**

Built in 3 Sizes From 1 H. P. to 10 H. P.

THE FOLLOWING CONCERNS ARE SAVING MONEY WITH TURNER UNI-DRIVE:

Kansas City Terminal Railway Co.
Ohio Pattern & Foundry Co.
Missouri Pacific Railroad.
Kansas City Power & Light Co.
City of St. Louis, Mo.
Santa Fe R. R.

Locomotive Finished Material Co.
Standard Sanitary Mfg. Co.
Tennessee Copper Co.
Union Wire Rope Co.
Cushman Chuck Co.
Procter & Gamble.
Quaker Oats Co.
Wabash Railroad
Buick Motor Co.
Rohm & Haas
Emerson Electric Co.
Caterpillar Tractor Co.
Continental Can Co.
Sheffield Steel Co.

Use on lathes, milling machines, turret lathes, shapers, radial drills, etc. Easily adapted to all types of special machine application.

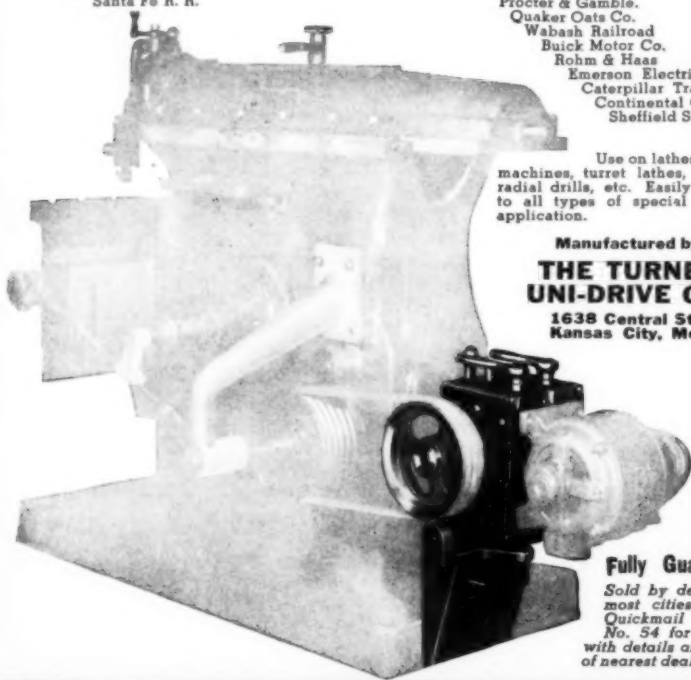
Manufactured by

**THE TURNER
UNI-DRIVE CO.**

1638 Central St.,
Kansas City, Mo.

Fully Guaranteed

Sold by dealers in most cities. Send Quickmail Coupon No. 54 for circular with details and name of nearest dealer.



Announcing—



The "BLUE DEVIL" Aristocrat of Socket Screws

WRITE TODAY for a copy of our complete catalog covering Safety Socket Screw Products, Milled Studs, Square Head Alloy Steel Set Screws, Headless Set Screws, Tool Post Screws, etc.



This new and better Safety Socket Screw offers you:

- A sturdier **cold-formed head** with unimpaired continuity of fibers.
- Increased metal section at union of head and body.
- Precision formed hexagon socket with true sides and no taper.
- Chamfered edge **knurled** to facilitate handling.
- Concentric head—square shoulder.
- Distinctive **gun metal finish**.

Let us tell you more about the exacting selection of material . . . our precision manufacturing methods . . . rigorous testing . . . our high standards of service. *Quickmail Coupon No. 41 will bring you complete information.*

SAFETY SOCKET



SCREW CORPORATION

4442 N. KNOX AVE.;

CHICAGO, ILL.

Announcing...

A New 3-SPEED



for
Tool Rooms
Machine Shops
Patternmakers
Sheet Metal Shops
General Automotive Shops



Multiple Speed Flexible Shaft Machines are adaptable to a greater variety of shop operations. Make Your Investment Pay!

COMPARE PRICE! WE GUARANTEE QUALITY!

SPECIFICATIONS:

Motors—1/4 h. p. size, split phase
1/3 h. p. size, capacitor type
1/2 h. p. size, repulsion-induction
110/220 volt, 60 cycle, A. C.
For other than standard motors,
add \$5.00 on 1/3 and \$7.50 on
1/2 h. p. motors.

Flexible Shafts:

1/4 h. p. machine, 4 ft. long.
1/3 h. p. machine, 5 ft. long.
1/2 h. p. machine, 6 ft. long.

Quickmail Coupon No. 19 will bring the
new WYCO Catalog No. 38.

Model	h. p.	Speeds	Price
10-A	1/4	900-1800-3600	\$60.00
20-A	1/3	2400-3600-4800	72.00
20-AC	1/3	2400-3600-4800	77.00
20-AH	1/3	1800-3600-7200	82.00
20-AI	1/2	2400-3600-4800	82.00
20-AA	1/2	900-1800-3600	89.50

Equipment included: with models 10-A,
20-A & 20-AI—wheel arbor and drill chuck.

With models 20-AC and 20-AH—wheel
arbor and collet handpiece.

With model 20-AA for auto work, 7-inch
angle head.

Shipping weight, knocked down—100 lbs.

WYZENBEEK & STAFF, INC.

838 W. HUBBARD ST.,

CHICAGO, ILL.

WELLS BAND SAW

The quick way to cut sawing costs—metal of all kinds—bars, tubes, sheets, angles—any shape **Accurately—Economically**

Now! with 3 speed control



No. 8 Size
8" diameter
round or
8"x16"
flat.

No. 5 Size
5" diameter
round or
5"x10"
flat.

*Send
Quickmail Coupon
No. 31 for details.*

"Saw it the WELLS Way"

WELLS MFG. CORP. Three Rivers, Michigan

INTERIOR STEEL SHELVING

ADJUSTABLE—NEAT—STURDY—EASILY ERECTED

Style No. 412-0

As illustrated, open type, 8 shelves in height. Rack consists of four 36" wide units. Overall 12' 0" long, 1' 0" deep, 7' 3" high. Capacity each shelf over 400 lbs.

\$32.65★

Style No. 412

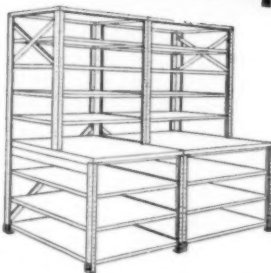
Same as above except with closed backs, ends, center partitions and bases.

\$44.60★



Style No. 540 **\$30.64★**

Closed Type Parts Bins consist of 2 units 36" wide. Overall 6' 0" long, 1' 0" deep, 7' 3" high. Total of 40 bins with bin fronts and label holders.



Style No. 118

Ledge Type
Open Stack.

\$22.10★

Consists of 2—36" units. Overall 6' 0" long, 7' 3" high with ledge 3' 3" high. Above ledge 1' 0" deep, below ledge 1' 6" deep.

Send Quickmail Coupon No. 10 for additional information

★ Prices F. O. B. Cleveland, Ohio. Shipped knocked down.

THE INTERIOR STEEL EQUIPMENT CO.

2352 East 69th STREET, CLEVELAND, OHIO

New York Office
101 Park Ave.
Caledonia 5-1289

Chicago Office
Madison Terminal Bldg.
Randolph 3103

Philadelphia Office
4308 No. Broad St.
Michigan 6464

SHELVING ● LOCKERS ● CABINETS ● FILES ● DESKS

MORE . . .

**than a
mere
Turning
Tool!**



The R & L is a Turning Tool—and then some. It does the work of 14 tools—costing at least four times as much. R & L does turning, drilling, pointing, burnishing, centering—and when required it can do two or three of these jobs simultaneously. R & L can switch from right to left hand operations in ten seconds.

R
RIGHT

AND

L
LEFT

Available in five sizes, R & L is adaptable to almost every turret lathe or screw machine need. R & L gives you sturdy, precision construction plus multiple operation.

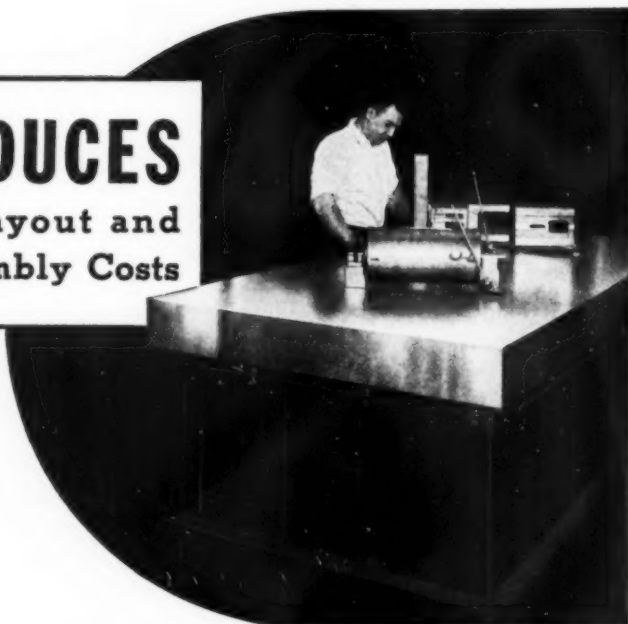
Tested and approved in all kinds of plants, R & L saves money for you in initial cost—in set-up and operating time—in maintenance costs. R & L merits your investigation.

Quickmail Coupon No. 37 will bring your free copy of our new booklet showing R & L Tools in operation on all kinds of work, with specifications and complete instructions.

**R and L Tools, 1825 Bristol St.,
Niketown, Philadelphia, Pa.**

REDUCES

... Layout and
Assembly Costs



CHALLENGE *Semi-Steel Surface Plates*

Absolutely level and rigid, this dependable layout surface plate promotes accurate, profitable work. It saves time . . . reduces waste motion and improves workmanship on every job. Challenge Semi-Steel Surface Plates are made of highest grade iron and steel, planed square and finished all over. Will not dent or sag; being reinforced underneath by heavy ribs. Standard sizes: 12x18 to 48x96 inches. Special sizes to order. The arc-welded frame with 32 lock leveling screws is optional.

●
*Write for prices
and full infor-
mation today!*

THE CHALLENGE MACHINERY COMPANY

CHICAGO
17-19 E. Hubbard Street

GRAND HAVEN, MICH.

NEW YORK
200 Hudson Street

KRW Hydraulic and Sensitive ARBOR PRESSES

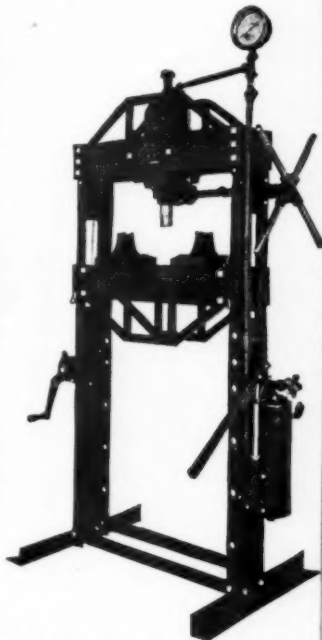
*New Improvements, Special Built-in Features and Lower Prices
make them an outstanding value.*

THE last word in convenience, efficiency and ease of operation. Built extra strong and well braced, with steel trusses electrically welded, these presses will withstand strains that would cause presses of lighter and inferior construction to buckle or collapse.

Hand wheel for sensitive press operations has sliding handles which pull out to the ends for increased leverage. Work does not have to be changed from the work table as is the case with other make presses having a separate sensitive press unit mounted on the side or elsewhere.

The importance of this KRW feature as a time and labor saver can be appreciated. Also there is **NO EXTRA CHARGE** for this important built-in feature on a KRW Press. Work table can be raised easily with one hand. A strictly one-man Press.

Write for literature giving full details and specifications of all KRW Arbor Presses.



PRICES F. O. B. FACTORY, ARCADE, N. Y.

No. 37—35 ton Hydraulic and Sensitive Arbor Press.....	\$150.00
No. 37E—50 ton Hydraulic and Sensitive Arbor Press.....	180.00
No. 37F—70 ton Hydraulic and Sensitive Arbor Press.....	300.00

Gauge and fittings, \$15.00 extra on all presses.

Use Quickmail Coupon No. 25

K. R. WILSON

10-16 Lock Street, Buffalo, N. Y., U.S.A.

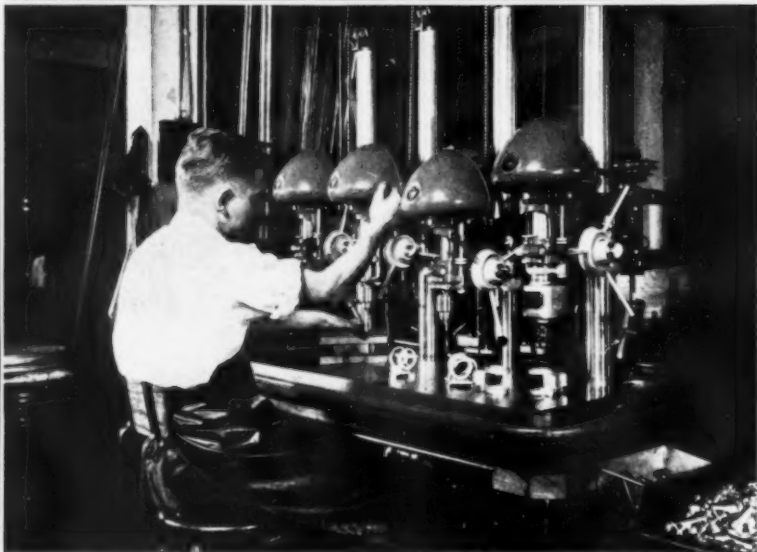
Export Department

90 West St., New York, N. Y.

West Coast Branch

722 Mateo St., Los Angeles

HOW INDUSTRY SAVES BY USING LIGHT POWER TOOLS



Low first cost, economical operation and low maintenance cost are some of the reasons for the rapid adoption of light power tools by industry.

Delta tools, for instance, are produced under modern production conditions like modern automobiles. This means they cost less for the same production value than heavier tools that are made up either in small lots or on special order.

While no claim is made that light tools can or will replace heavier machines on many classes of work, there are many operations on which the lighter tools will not only perform as well as heavier, more expensive machinery, but will actually out-perform and out-wear the heavier ma-

chines, due to more modern design, the use of self-sealed ball bearings, etc.

Delta low-cost drill presses require less power to operate. Replacement parts cost less. Their upkeep cost is remarkably low. They are flexible, and can be used in special set ups and in numerous combinations. They are portable and can be used for auxiliary operations. They occupy less space. Above all, they have proved all these advantages to thousands of this country's leading manufacturers.

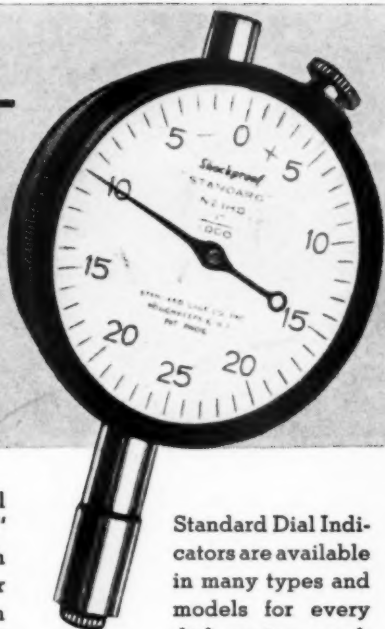
Find out how you can cut your cost with Delta tools. Send Quickmail Coupon No. 67 for latest 1939 Delta Catalog, and name of nearest Delta dealer.

Delta Manufacturing Co., 671 E. Vienna Ave., Milwaukee, Wis.

"Shock- Proof"

means

SUSTAINED ACCURACY



The new STANDARD Dial Indicators are "Shockproof"—immune to shocks which impair the accuracy of other indicators. The precision gaging mechanism of STANDARD Dial Indicators is isolated from shocks, jolts and jars. Thus STANDARD accuracy is sustained over longer periods and these gages set new standards for duration and degree of accurate service.

Standard Dial Indicators are available in many types and models for every dial gaging need. Catalog No. 7 covers the complete STANDARD Line of precision gaging equipment. May we send you a copy?

For Accurate Gaging Come To "Standard"

Quickmail Coupon No. 38 will bring copy of new illustrated bulletin.

STANDARD GAGE CO., INC.
POUGHKEEPSIE, NEW YORK

ARMSTRONG



To get all the profit use the right
ARMSTRONG TOOL HOLDER on every operation

The extreme strength and versatility of ARMSTRONG TOOL HOLDERS, leads in many shops to the use of a few types for all operations. While any ARMSTRONG TOOL HOLDER "Saves All Forging, 70¢ Grinding and 90¢ High Speed Steel", and even the wrong tool holder will out-perform the "right" forged bar tool . . . the very highest efficiency will be obtained only by using the correct ARMSTRONG TOOL HOLDERS—each designed for its specific work.

ARMSTRONG TOOL HOLDERS cost so little compared with the years of service they give—cost so little in comparison with the sets of forged tools each one replaces—it is a sound rule to insist that the right size and type be used for each different operation on lathes, planers, slotters and shapers. If you haven't checked over the modern Armstrong System against the tools you are using, write for a B-37 Catalog TODAY.

It is the only way to know that you are getting all the profit to be had on every operation

To save time, use Quickmail Coupon No. 20.

ARMSTRONG BROS. TOOL CO.

"THE TOOL HOLDER PEOPLE"

308 N. FRANCISCO AVE.,

CHICAGO, U. S. A.

Eastern Warehouse and Sales: 199 Lafayette St., New York, N. Y.

San Francisco

London



ARMSTRONG TOOL HOLDERS Are Used in Over 96% of the Machine Shops and Tool Rooms

HITCHCOCK'S *Machine Tool* BLUE BOOK

**Selected
Circulation**

**26,000
Monthly**

SEPTEMBER, 1938

THIRTY-THIRD YEAR

Member



GEORGE O. McKIBBEN
President

J. E. HITCHCOCK
Vice President

ROBERT C. VAN KAMPEN
Business Manager

WESLEY G. PAULSON
Editor

CURTIS H. BOOS
Advertising Manager

M. L. YONTS
Circulation Manager

CONTENTS

Cutting Fluids A Factor in Machinability By A. J. McDuff.....	39
Comments from the Editor.....	54
New Equipment.....	57
New Trade Literature.....	137
Quickmail Coupons	88-93
Buyers' Directory	139-148
Index of Advertisers.....	177, 178

(Copyright, 1938, by Hitchcock Publishing Co.)

Published Monthly By

HITCHCOCK PUBLISHING COMPANY

508 South Dearborn Street, Chicago, Illinois

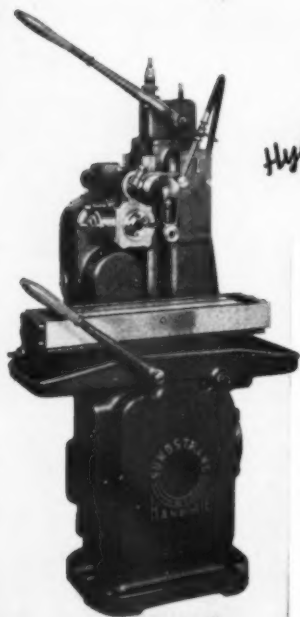
Warren E. Hoffman
New England
Representative

Representatives
A. E. Wailes
55 W. 42nd St.
New York City

Joseph E. Casey
Mid-Western
Representative

ANNOUNCING

Number O Rigidmil



Hand Feed

Hydraulic Feed



Here's new speed, easy set-up, high production, accuracy, and economy on small milling. Here's the Sundstrand Number O Rigidmil . . . with hydraulic feed or hand feed; new power, strength, rigidity and direct action.

Operation of entire machine is smooth, reliable, efficient . . . it saves time, saves operating effort, saves cutter-grinding. Easily adjusted dogs control automatic cycles for conventional or climb-cut milling. Turning a dial adjusts the Sundstrand Hydraulic Feed to any rate whatever between $\frac{1}{2}$ " and 38" a minute. Rapid traverse is 325". Tables are 8" wide; 34" or 46" long. Spindle speeds from 25 r.p.m. to 2400 r.p.m., through pick-off gears, are available in two groups of 61 changes each.

For certain light milling operations Number O Rigidmil with hand feed and 8" by 30" table offers same wide range of spindle speeds noted above, same high accuracy, easy handling, and new hand-miller stamina. Capital investment is even lower than for the Number O with Hydraulic Feed.

There are hundreds of operations on which Number O Rigidmils can cut costs. Investigate! Write for new bulletin. Send sample work-pieces for reliable production estimates. Use Quickmail Coupon No. 7.

Sundstrand Machine Tool Co., 2535 Eleventh St., Rockford, Ill., U. S. A.

RIGIDMILS - STUB LATHES

Tool Grinders - Drilling and Centering Machines
Hydraulic Operating Equipment - Special Machinery



CUTTING FLUIDS

A FACTOR IN MACHINABILITY

By A. J. McDuff, Engineer
D. A. Stuart Oil Co., Chicago

INTRODUCTION—This paper, presented before the Symposium on Machinability, American Society for Metals, Watertown, Mass., presents the viewpoint of a sales engineer based on experiences in the application of cutting fluids in large production plants. The theoretical portions of this paper represent the opinions of my associates in their engineering and research capacities. Emphasis is placed on the importance and complexity of cutting fluids in the realms of machinability.

The representative cutting fluids tested in connection with the preparation of this paper were all compounded in the laboratory of the company with which I associated, and in no way are they intended to reflect on any competitive materials, but rather are intended to bring out a better understanding of the function and proper selection of modern cutting fluids.

Acknowledgment is hereby made to the Morse Twist Drill & Machine Co., New Bedford, Mass., for their cooperation in running the drilling and tapping torque tests, and also to the Research Laboratories of the D. A. Stuart Oil Co., for correlating the load-carrying characteristics of the cutting fluids discussed in this paper.

Function of Cutting Fluids

FROM industry today comes an insistent demand for cutting fluid facts. Our engineering societies and leading research engineering workers are recognizing the need for definite information, and much work has been done and considerable progress made. Tests on the various extreme pressure testing machines have thrown considerable light on cutting oil problems. The function of sulphur as an anti-weld and of fatty oils, chlorine, phosphates and other chemical compounds as lubricity or anti-friction agents is also clearly demonstrated by some of these tests. While such information is very valuable, it is not in any sense complete, as there are still many phases of the cutting fluid problem which remain to be clarified.

The accompanying diagram illustrating the mechanism of chip formation and the relation of the chip to the tool is very well known. The formation of the built-up nose at "B" and

the method of its formation are still the subjects of considerable controversy. That the cutting fluid greatly affects this chip formation, consequent tool life and surface finish are well recognized facts, but the manner in which it functions to produce this effect is as yet not clearly understood. It is obvious, however, that at the point "A" where the chip bears on the rake of the tool, there is an area of high pressure and high temperature.

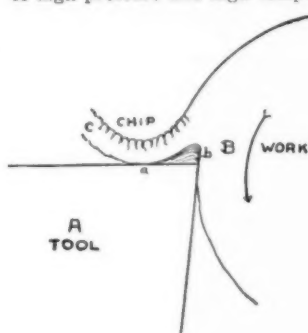
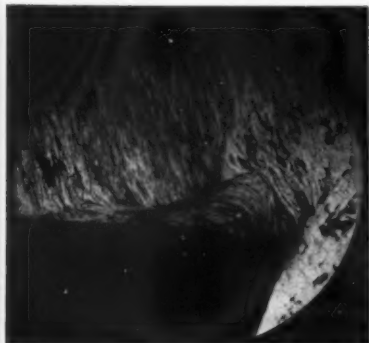


Fig 1

Temperatures are developed not only by friction, but by the distortion of the metal in the chip. When the pressure and temperatures are high there is a definite tendency for the metal of the chip to weld to the tool at this point, and the action of sulphur in cutting oil is unquestionably to prevent this welding.

Increased lubricity due to other elements in the cutting fluid unquestionably will reduce frictional heat and will affect the contour of the chip and its relation to the tool surface. The cooling function of the cutting fluid is obviously important.



Built-up edge moving away from tool point.

Still a Baffling Question

The question as to how the cutting fluid reaches the almost inaccessible point of contact of the chip and the tool is still a baffling one. The early assumption that the work cracks ahead of the tool and that the cutting fluid is drawn in to the resultant space was suggested by Kingsbury. Bingham emphasized the part that the adhesiveness or wetting qualities of the fluid played in causing it to follow the metal surfaces to the contact point even under adverse conditions. The most recent investigators question the idea of a crack ahead of the tool point. It is certain, however, that the cutting fluid does affect the action at these seemingly inaccessible points, and it is possible that the answer lies in the pulsating action at the point of the tool, and that under such conditions the oil or oil vapor finds its way in to the points of greatest stress.

Brief History of Development of Cutting Fluids

The first cutting fluids were fixed or atty oils. Before the commercial development of petroleum lubricating oils the fatty oils, rape, sperm, lard and others were used for bearing and general lubricating purposes. These also make good cutting lubricants so that first there was no cutting oil problem, the same lubricant being used for

both general lubrication and cutting. It was soon discovered, however, that the petroleum products did not replace the fats for cutting as they did for bearing lubrication and lard oil or lard oil diluted with light petroleum oil became the almost universal cutting oil. Where soluble oils were needed a mixture of lard oil with soda ash or other caustic, and water made a passable compound.

The rapid development of high speed and automatic machinery, the discovery of tool steel with consequent high machining speeds and finally the World War with scarcity and high prices of fats made cutting fluid development imperative. By-products fats, such as degreas and various recovered leather oils were worked into the cutting oil picture, but the first real discovery was that of sulphurized oils.



Adequate lubrication saves tool wear and improves the product.

The peculiar ability of sulphur to cool and prevent seizure in heavily loaded bearings was early recognized. Patent records of the last half of the 19th Century are full of formulae of sulphur mixtures with lubricating materials. We have no definite record of the time when a handful of sulphur was first added to the regular cutting oil to give better finish on difficult work, but the close of the war found the sulphurized oil development well under way.

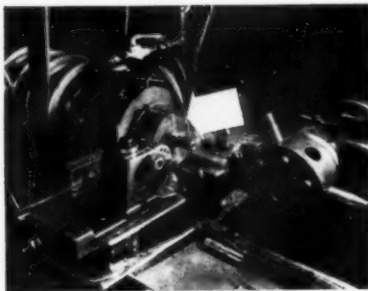
Types of Cutting Fluids Most Commonly Used

Sulphurized Mineral Oils
Sulphurized Mineral Oils diluted with Mineral Oil
Sulphurized Fatty Oils
Sulphurized Fatty Oils diluted with Mineral Oil
Mineral-Lard Oil
Lard Oil
Sperm Oil
Mineral Oils
Soluble Oils

The first sulphurized cutting oils were sulphurized fats: viscous bases which for use are blended or diluted with several parts of light petroleum machine oil. Later the petroleum oils themselves were sulphurized and sulpho-chlorinated, and gave us products that are both inexpensive and highly efficient. At the present time there are many variations of the above types of oil commercially available, and undoubtedly it may be said truthfully that sulphurized oils have replaced lard oil as the universal cutting lubricant.

Soluble Cutting Fluids

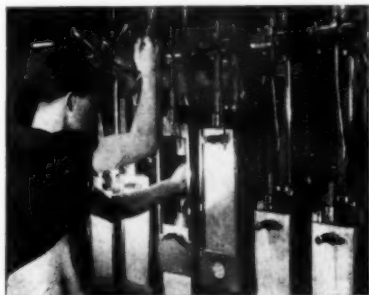
The selection and application of soluble oils is too broad and too complicated to be included in this paper.



Lubrication is a study that will pay dividends in any kind of machine tool operation.

In passing, I might state briefly that soluble oils are used effectively on jobs where the chips are light and the sur-

face speeds run high, or when a coolant is more desirable than a lubricant and when such usage does not interfere with the lubrication of high speed and closely fitted bearings. Again, the exceptional job may require it, such as



Proper lubrication is especially important in deep drilling operations.

turning at extremely high surface speeds or on turret-lathe operations when cuts are extremely heavy, to avoid excessive heating and the carrying-away of large amounts of oil by the rapid accumulation of long heavy chips.

Types of Sulphur Compounds

There is a need for thorough laboratory study of sulphur in oils. Sulphur is a very versatile element. In oil it combines in many forms, some of which are desirable and useful; many of which are of little value or even objectionable. Frequently inert sulphur compounds occurring naturally in the crudes and carried through the refining processes are used to mix with other active sulphur compounds and thus give a fictitious higher laboratory sulphur value. To date we have no practical laboratory method of distinguishing chemically between effective and non-effective compounds. It is obvious that the writing of a specification for a sulphurized oil is an extremely difficult one and from a performance standpoint it is not possible unless a work-factor is included.

Effect of Sulphur on Tool Wear

While sulphur is a very desirable element in cutting fluids and the most effective one we know to impart to the oil the character of high load-carrying, anti-scuffing, anti-weld, etc., it appears to be somewhat abrasive in the oil under certain conditions.

On some jobs the maximum sulphur content is highly desirable, while on other jobs the minimum sulphur content, consistent with good finish, is more suitable from a standpoint of tool life. There is no definite line of demarcation with this factor. Each job or application has to be observed for some time to determine all factors involved and to select intelligently, the best formula.

When the job is giving trouble from a standpoint of poor finish and rapid break-down of cutting edge, then the high sulphur content is most effective and essential. But when the job is free from trouble and the finish is satisfactory, then an oil of lower sulphur content may increase the life of certain tools. However, one must bear in mind the risk involved in lowering the safety factor of the oil through lowering sulphur content, when a change in the stock may occur or some defect in the material may cause rapid break-down of tools, while an oil of higher sulphur contents might have withstood the storm.

Factors Affecting Selection of Cutting Fluids of the Sulphurized Type

Oils containing the highest percentages of active sulphur will give the best results when the following factors are involved:

To obtain:—Better finish on machined parts and smoother threads

To overcome:—Loading of tools or metallic pick-up

Machining:—Stainless steels

Alloy steels

Monel metal

Nickel

Iron

Copper

Hard bronze

Low carbon steels such as SAE No. 1010 Steels with low Brinell readings

Operations:—Gear shaping and gear generating
Threading
Broaching
Deep hole drilling
Reaming

With:—Heavy feeds when the surface speed is correspondingly slow.

Oils containing **minimum** percentages of active sulphur, consistent with good finish on machined parts, will give the best results when the following factors are involved:

To obtain:—Longer tool life
Lower oil costs

Transparency

Machining:—Free-cutting steels

Screw stock and high sulphur steels

Machinery steel

Medium and high carbon steels

Tool steels

High speed steels

Non-ferrous metals

Steels with high Brinell reading

Operations:—High speed automatic screw machines

Gear hobbing

Thread milling

Turret lathe

Drilling

Milling

With:—Light feeds when the surface speed is correspondingly high.

Testing Machine Results

Load-carrying characteristics of five representative oils were correlated on



The right kind of lubrication will reduce cutter cost in gear hobbing.

the Faville-LeVally Extreme Pressure (EP) Testing Machine, using their latest style of test parts.

The machine is fundamentally an enlarged mechanically driven nut cracker, with a rotating journal held between two V-block bearings at the high pressure position. The load is applied by compressing a calibrated spring by means of a ratchet wheel on a shaft, with a right and left hand screw on opposite ends. Each revolution of the test journal advances the ratchet wheel one tooth, thus gradually and uniformly applying the test load. There is a gauge registering, in pounds, the jaw load on the spring, and therefore on the test parts and oil at all times.

A second gauge working in conjunction with a siphon bellows shows the frictional loss in the test bearings at all times. This gauge registers in pound-inches of torque.



Oil cost is a small item compared with the cost of broaching tools.

In running a test, the test journal is immersed in a cup filled with the lubricant to be tested. After a minute "run in" period at 250-pounds, jaw load, a record of the torque is made. The loading lever is then engaged with the loading ratchet wheel. As the load increases a record of the torque is made for every increase of 250-pounds of jaw load until the oil film fails or the limit of the machine is reached.

The lower the load at which an oil fails, the poorer it is for withstanding loading, scuffing, etc.

A comparison of the torque loss with different oils indicates certain values they may have as **lubricating oils**. However this torque reading has never been of final value in determining performance as a **cutting oil**.

One must not try to interpret these machine results to cutting oil practice. However, the seizure point often shows why with one oil, a tool loads while another oil with higher seizure point, does not load.

Description of the Five Representative Cutting Fluids

Oil No. 1 is a straight sulphurized mineral oil containing no fats and having an active sulphur content of 3.6%. Its Seybolt viscosity is 242' at 100-deg. F.

Oil No. 2 is a compound of mineral oil with 8% of sulphurized fatty oil and has an active sulphur content of .4%. Its viscosity is 175' at 100-deg. F.

Oil No. 3 is straight number one lard oil having a viscosity of 249' at 100 deg. F. Oleic Acid content is 10.0%.

Oil No. 4 is a so-called Mineral-Lard Oil. It is a mineral oil compounded with 20% of No. 1 Lard Oil. Its viscosity is 120' at 100 deg. F.

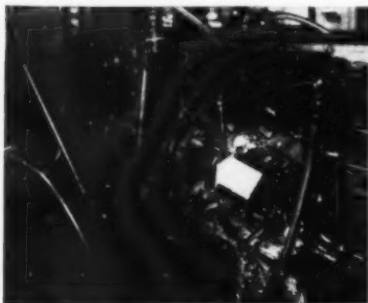
Oil No. 5 is a straight mineral oil containing no sulphur or fats. Its viscosity is 200' at 100 deg. F.

Load-Carrying and Torque Characteristics of Five Representative Cutting Fluids on Extreme Pressure (EP) Testing Machine

Oil No.	1.	2.	3.	4.	5.
Jaw Load (Lbs.)				Torque (Inch-Pounds)	
250	11	10	8	10	13
500	14	12	9	12	17
750	19	16	12	17	22
1000	23	19	15	23	S. 800-lbs.
1250	28	23	18		S. 1050-lbs.
1500	33	27	21		
1750	36	31	28		
2000	38	35		S. 1800-lbs.	
2250	39		S. 2100-lbs.		
2500	40				
2750	41				
3000	42				
3250	44				
3500	45				
3750	46				
4000	47				

Full Load of Machine, no seizure.

The point-pressure drilling and torque tapping characteristics of the five representative cutting fluids were conducted on an Olsen universal efficiency testing machine. This machine comprises a bed, at one end of which is the weighing and recording mechanism, while at the other end is the driving mechanism.

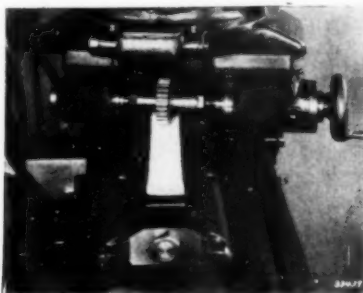


Oil is a vital factor in automatic screw machine operation.

The weighing end of the machine is in the form of pendulum mounted in ball bearings so that the torque may be weighed. The pendulum is fitted with a scale for indicating torque and also with recording mechanism, so that the relation between torque and penetration or revolution may be obtained in three magnitudes as to torque, and two as to penetration, or the number of revolutions in the relation between penetration and revolution may be recorded. In the pendulum head is a hydraulic support, which, in connection with a gauge, weighs the pressure at the point of the drill continuously during the test.

Observations of the behavior of cutting fluids in connection with these tests are by no means conclusive. There are so many other factors involved in actual production that test machines cannot record. However, the efficiency of certain oils over others can be noted, and it is also interesting to learn that the results check, in a large measure, with the practical application of cutting fluids. The values

expressed in pounds and inch pounds are not specific but are the average for each oil on the respective steels.



In gear crowning, proper lubrication prevents undue tool wear and gear inaccuracies.

Point-Pressure Characteristics of Cutting Fluids Used In Drilling 18-8 Stainless Steel

Brinell Hardness — 241
Length of hole drilled— $1\frac{1}{2}$ "
Drill— $\frac{3}{8}$ " high speed steel
Speed—250 r.p.m.
Feed—.010" P.R.

No. 1 Oil—	400 lbs.	point pressure maximum
No. 2 Oil—	950 lbs.	point pressure maximum
No. 3 Oil—	800 lbs.	point pressure maximum
No. 4 Oil—	750 lbs.	point pressure maximum
No. 5 Oil—	1100 lbs.	point pressure maximum

Torque Characteristics of Cutting Fluids Used in Tapping 18-8 Stainless Steel

Tap— $\frac{3}{4}$ " — 10 USS high speed steel spiral point ground thread.

Speed—36	r.p.m.
No. 1 Oil—	370 inch pounds maximum
No. 2 Oil—	385 inch pounds maximum
No. 3 Oil—	410 inch pounds maximum
No. 4 Oil—	400 inch pounds maximum
No. 5 Oil—	500 inch pounds maximum

Point-Pressure Characteristics of Cutting Fluids Used In Drilling Tool Steel

Carbon content — 1.20%
Brinell hardness—179
Length of hole drilled—2"
Drill— $\frac{3}{4}$ " high speed steel
Speed—250 r.p.m.
Feed—.010" P.R.

No. 1 Oil—	850 lbs.	point pressure maximum
No. 2 Oil—	900 lbs.	point pressure maximum
No. 3 Oil—	900 lbs.	point pressure maximum
No. 4 Oil—	850 lbs.	point pressure maximum
No. 5 Oil—	850 lbs.	point pressure maximum



**NAMCO Micrometer
Fixture insures identical
check on circular
chaser cutting edges.**

USERS of Namco Circular Chaser tools marvel at the *extra* production they pick up through time saved in chaser removal, grinding and replacement.

Chasers and blocks are removed intact—ground on the same blocks that support them while cutting. Then the grind is quickly and precisely checked on a National Acme micrometer fixture. When returned to the head each chaser bears a relationship to the work which is *identical* with that before removal.

No individual adjustments of chasers are necessary for all settings are made in the tool room—not on the machine.

These tools are equivalent to gages in precision, and Circular Chasers give you ten times the life of ordinary chasers. The "down time" they save will pick up extra production for you—just try them. Capacities up to 13%."

NATIONAL ACME

THE NATIONAL ACME CO.
175 East 151st Street, Cleveland, Ohio

☐ Send us your CIRCULAR CHASER
DIE Bulletin. ☐ Have your representative call regarding our Threading work.

Name _____
Firm _____
Address _____

10 times the chaser life...every re-grind identical

Torque Characteristics of Cutting Fluids In Tapping Tool Steel

Tap— $\frac{3}{4}$ " — 10 USS high speed steel spiral point ground thread.

Speed—36 r.p.m.

No. 1	Oil—330	inch	pound	maximum
No. 2	Oil—350	inch	pound	maximum
No. 3	Oil—405	inch	pound	maximum
No. 4	Oil—400	inch	pound	maximum
No. 5	Oil—600	inch	pound	maximum

Point-Pressure Characteristics of Cutting Fluids In Drilling Machinery Steel

Carbon content—.20 — .30%

Brinell hardness — 126

Length of hole drilled— $1\frac{1}{4}$ "

Drill— $\frac{3}{4}$ " high speed steel

Speed—250 r.p.m.

Feed—.010" P.R.

No. 1	Oil—400	lbs.	point	pressure	maximum
No. 2	Oil—500	lbs.	point	pressure	maximum
No. 3	Oil—600	lbs.	point	pressure	maximum
No. 4	Oil—500	lbs.	point	pressure	maximum
No. 5	Oil—600	lbs.	point	pressure	maximum

Torque Characteristics of Cutting Fluids Used In Tapping Machinery Steel

Tap— $\frac{3}{4}$ " — USS high speed steel spiral point ground thread.

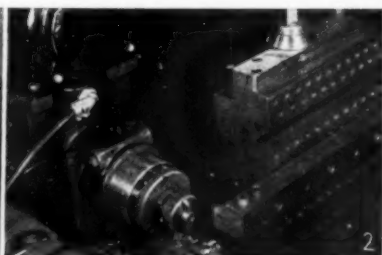
Speed—36 r.p.m.

No. 1	Oil—200	inch	pound	maximum
No. 2	Oil—200	inch	pound	maximum
No. 3	Oil—225	inch	pound	maximum
No. 4	Oil—205	inch	pound	maximum
No. 5	Oil—280	inch	pound	maximum

Co-operation Between Production Executive and Sales Engineer

The nature of this cutting fluid problem demands from the factory engineer, the machine operator, and in fact every man connected with the cutting of metal, the closest and most careful attention. The very complexity of the machining operation, involving as it does different conditions of speed, tool grinding, tool hardness, stock variations, lubrication and machine conditions, and in addition the always more or less uncertain human element, makes this a baffling problem. Too often the cutting lubricant is shouldered with blame for strictly mechanical failings, and like the victim of quack medicine, the user goes from one oil to another, sometimes elated by the apparent elimination of his troubles and at other times depressed by overwhelming difficulties.

With so little accurate information published on the subject of cutting tool lubrication, I feel sure the many bits of theoretical and practical information contained in this paper will enable some of you to solve some of your perplexing problems. You will not find all the answers, but I trust it will promote and stimulate further interest in this phase of machinability.



Machine and Fixture Developments That Help Smaller Shops

Routine high-precision boring, turning, and facing—usually associated mainly with mass production work—have, in recent years, undergone a wide extension into low production

fields. Responsible for this development are two major factors:

1. The introduction of precision machinery of a high degree of flexibility.



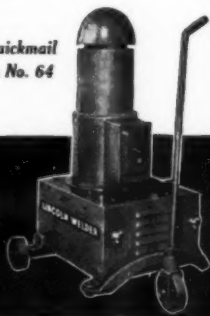
"WE SAVE 60% ON TOOLS AND DIES WITH OUR LINCOLN WELDER"

● A machine shop in Cleveland, Ohio, paid for their Lincoln Welder with savings from tool welding alone. This user says, "We make the shanks and blanks for our tools and dies from plain mild steel. Then with our Lincoln Welder and Lincoln 'Toolweld' Electrode we hard-face the cutting edges, dress them and have a product that wears just as long as tool steel, and we save more than 60%. In addition to these savings which alone have paid for our Lincoln Welder, we also save a lot of money building our

jigs and fixtures and special shop structures. The welder also comes in handy for repair work on broken and worn parts. Our Lincoln Welder is the most profitable investment we ever made."

Machine shops everywhere report savings of \$50 to \$300 per month with this new Lincoln Welder. Since it is of d. c. motor generator type, it will weld metals and alloys of all kinds. It uses as little as 10c worth of power per hour and goes to work at the push of a button. See how it will cut your costs and bring in extra business.

Use Quickmail
Coupon No. 64



THE LINCOLN ELECTRIC CO.

Largest Manufacturers of Arc Welding Equipment in the World

MAIL THIS COUPON TODAY

**THE LINCOLN ELECTRIC CO.
Dept. AD-525, Cleveland, Ohio**

Send a free copy of Bulletin 314 and payment details on the Lincoln Machine Shop Welder.

Name Position

Company

Address

City State

2. Availability of universal fixtures which further increase the flexibility of the precision machining equipment.

High precision boring, facing, and turning equipment was, of course, developed primarily for the mass production industries. In its early stages such equipment was highly specialized and custom-built in character.

As the demand for this equipment increased, it was found desirable to develop standard units such as precision boring spindles and boring units, which could be produced in quantities at lower cost and yet readily adapted to industry's special requirements.

The next step in the process was the development of standard machines built around standard units, which not only reduced initial cost still further, but also, by inherent flexibility, eliminated much of the change-over cost coincident to design changes.

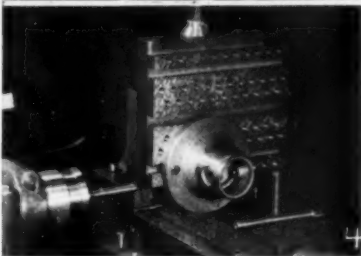
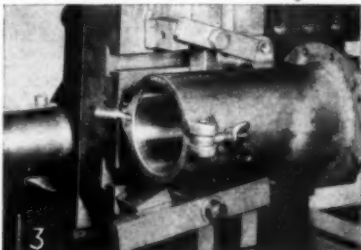
This development, while perhaps primarily intended to lower still further mass production costs over a period of years, resulted in the evolution of machinery which adapted itself ideally to the needs of shops with smaller production runs on wide varieties of parts. On such machines for instance, spindles may be placed on the bridge at any angle to the line of table travel.

The final stage in the adaptation of precision machining to low production runs consisted of the development recently of a universal indexing fixture designed for easy handling of wide varieties of work, being provided with three T-slots and six staggered rows of $\frac{1}{2}$ -inch tapped holes, one-inch apart, for mounting the work, tool bar, or sub-fixture.

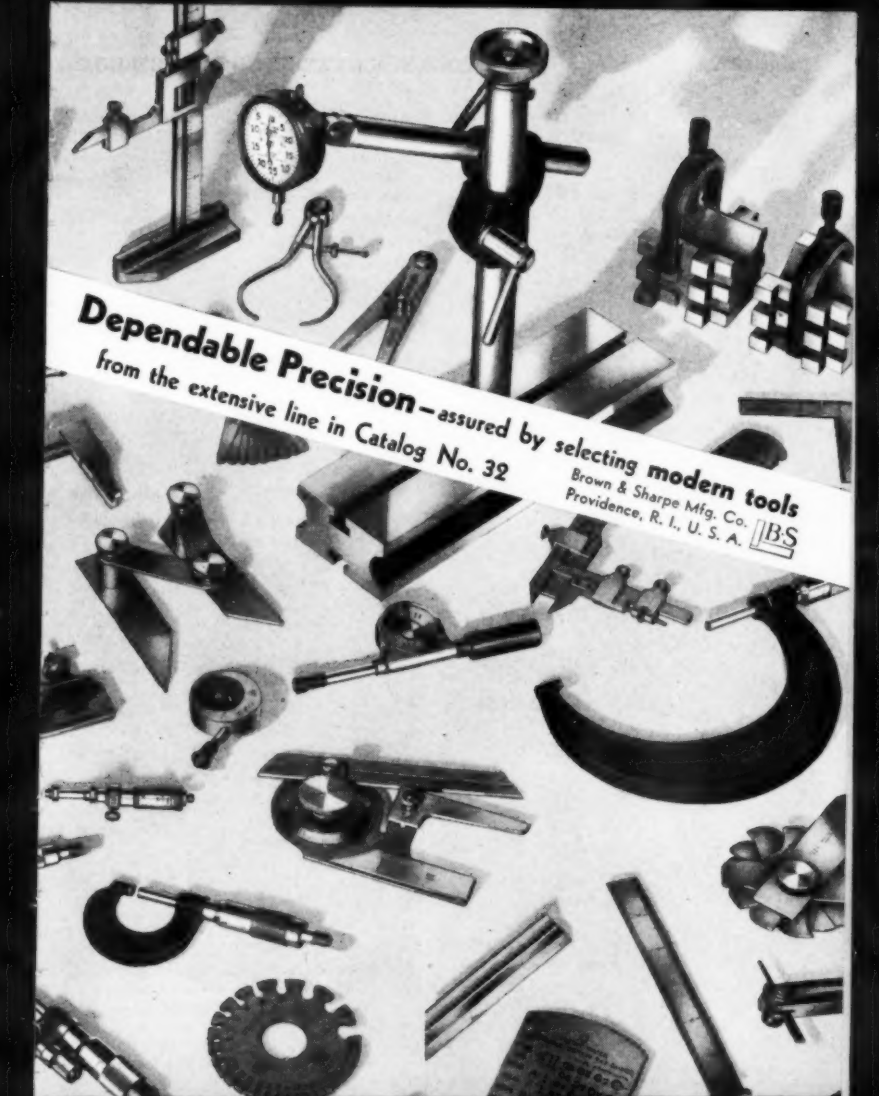
With the combination of a precision boring machine and such a fixture one could, for instance, mount the part on the fixture and boring tool on the spindle, or the part could be held in the spindle and the boring or facing tool held in the fixture. The upper part of the fixture is so designed that it can be mounted on the cross-slide either at right angles to, or parallel to the spindle, being provided with alignment keys for this purpose. The cross-

slide is equipped with a precision ground lead screw and the normally hand-fed fixture can readily be equipped with a standard hydraulic cross-feed cylinder.


The extent to which these developments have permitted the adaptation of precision machining to routine low-rate production, may be gathered from a few typical examples. Fig. 1 shows one set-up of a single spindle Ex-Cell-O precision boring machine with tungsten carbide tools and universal fixture for finish boring the stator body of a Diesel injector. Production runs on this unit are put through in lots of 50 at a time, with six holes to be finished to plus or minus two tenths, removing .008 to .010-inch on diameter.



In setting up, one hole is aligned with the spindle, and an adjustable stop and plug-gage then used for index locating of holes. If it were found necessary, in this case, to increase frequency of production runs, or a higher output per hour were desired, it would be a simple matter, of course, to add a simple indexing fixture to the universal fixture.



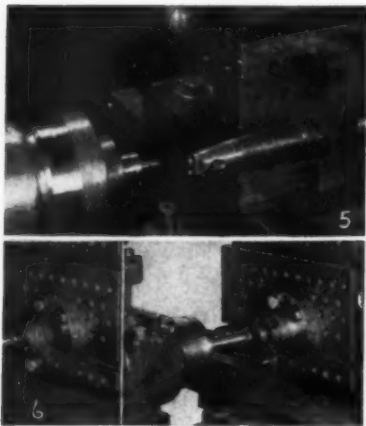
Dependable Precision—assured by selecting **modern tools**
from the extensive line in Catalog No. 32

Brown & Sharpe Mfg. Co.
Providence, R. I., U. S. A. 

**BROWN & SHARPE
TOOLS**

Fig. 2 shows the same type of machine and fixture applied to the facing and inside chamfering of an airplane engine valve key. The tool bar is mounted on the fixture and the part is held in the spindle in a simple centrifugal chuck, having two fingers which, as the spindle rotates, engage the tapered diameter of the part and hold it against the face plate. The tool, it will be noted, is of a combination type. It is brought up to position, fed in rapidly, the end of the key is faced off and at the end of the travel the tool is fed out gradually to internally chamfer the part.

For increased or continuous production—giving 300 pieces per hour—an hydraulic cylinder can be added to the machine to control the transverse fixture movement.

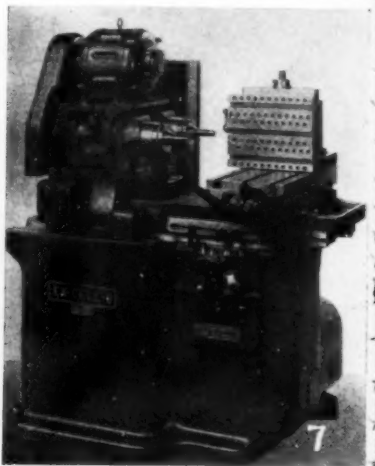


The tool bar in this set-up, incidentally, is also of a universal type readily adaptable to the mounting of a wide variety of tools.

Fig. 3 shows a similar Ex-Cell-O machine and universal fixture being used for machining a cylinder of a machine used for metering fluids. While production is in very small lots, the flexibility of the equipment permits the job to be done economically. Tolerances on this part, which has a bore

of $3\frac{1}{4}$ -inches, 8-inches long, are specified within .0001 inch. The material is a fairly soft high nickel alloy and a diamond tool is used for the boring operation.

While piston machining is generally considered as a mass production operation, the set-up in Fig. 4—again using the universal fixture and Ex-Cell-O precision boring machine—was found ideal for finishing of pin holes in a type of semi-steel piston required only in limited quantities. The set-up is also typical of many similar production requirements in smaller shops. Here, incidentally, may be noted an adjustable stop and a plug-gage similar to the ones referred to in Fig. 1. With these, the pin hole is aligned with the boring bar. Tolerances are held to two tenths.



Using the same equipment for precision taper-turning is illustrated in Fig. 5. The part is a taper valve unit required in production lots of 100 to 200. The boring bar with carbide tool is again on the fixture with the part held against a face plate with special adapter on a standard spindle. The spindle has been set over at an angle to give the correct taper. Finish turning of this part is of sufficient precision



The
Tension-
trol

*A Big Step Ahead
in Drives . . . by Berkeley*

Berkeley takes a Big Step in Advance with the new V-belt-Helical Gear Combination — with Tension-trol — retaining the advantages of both types minus their limitations. Tension-trol (the new multi-range tension control mechanism) gives the precise belt tension required.

The advantages are 25% greater load capacity and an equal percentage of added life, plus increased flexibility and lower production costs.

Sturdily constructed to outlast the machines, Berkeley Drives are attached with four bolts and become an integral part of your lathes, drills, grinders, shapers, milling machines, etc. These surprisingly low-priced "Standardized Special" Drives soon pay for themselves through the savings which they make possible. Try a Berkeley drive in your plant without obligation—they are unconditionally guaranteed to YOUR satisfaction!

Quickmail Coupon No. 15 will bring your copy of the new Berkeley Catalog.



BERKELEY ENGINEERING CO.
1381 E. 17th ST., CLEVELAND, OHIO

INDEX No. 38**High Speed
Vertical**

Low initial cost and maintenance.

Simple and easy to operate—no gears to clash—no gadgets to break. Hand feed through a table designed in proportion to the capacity of the machine enables the operator to feel the progress of the cutter.

Six spindle speeds, $\frac{1}{32}$ to $\frac{5}{16}$ " and mill capacity in tool steel. 8" cross travel, 16" longitudinal. Swivel head graduated 90° both ways. Operates on 110 volts.

Good territory open for dealers.

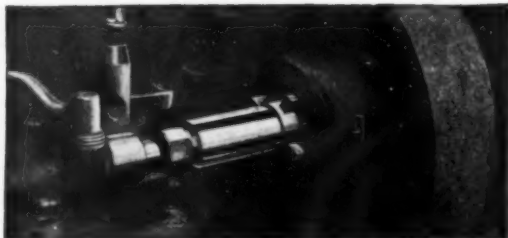
John Blank Machinery
JACKSON MICHIGAN



to hold five pounds pressure without lapping the part.

Where production runs are not continuous, but are repeated with considerable frequency, the designing of an inexpensive sub-fixture to be mounted on the universal fixture, simplifies the problem. Fig. 6 shows such a sub-fixture being used for boring a cast iron part. The ring locates the part from its diameter and is designed to permit boring completely through the part although mounted against the face of the fixture. The other four holes in this part (involving a problem not unlike that of Fig. 1, except in larger quantities) were bored on the same machine and fixture, using a simple added indexing sub-fixture.

In a considerable number of cases—particularly where it is desired to rough the part before finish boring, facing or turning—the same fixture with its adjustable vertical and horizontal cross-slides and fast index attachment, is being used on two-spindle precision boring machines, as shown in Fig. 7.

NICHOLSON**Expanding
Mandrels**

act as internal chucks, for use on lathes, grinders, shapers and millers—Big time savers on hurry up and break-down jobs—Eliminate searching for or turning proper size solid mandrel—Fourteen sizes accommodate all bores from $\frac{1}{2}$ " to 7"—Send for Bulletin 530.

W. H. NICHOLSON & CO.

117 Oregon St.,

Wilkes-Barre, Pa.

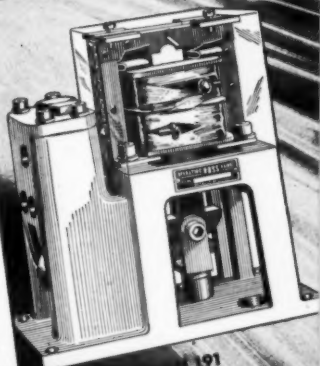
ROSS *Air Control* VALVES

for High Speed WELDING SERVICE

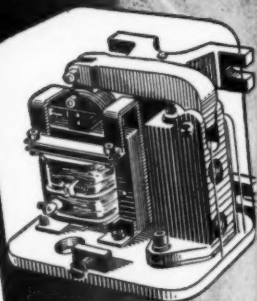
THESE two new air valves are designed for operation at high speeds. Model 165T for single acting and Model 191 for control of double acting cylinders. Compactly built and light in weight, yet extremely rugged to withstand severe service over prolonged periods of use. Poppet type, pressure seated, assures perfect seal. Line pressure utilized to reverse valve action. Eliminates return springs and permits the use of smaller solenoids. All working parts are readily accessible, with valve or solenoid removable by just loosening four bolts. Made only in $\frac{3}{8}$ " pipe size. Furnished in all the standard current characteristics. A size and type of valve for your air actuated equipment.

Send Quickmail Coupon No. 61
for Catalog No. 38

**ROSS OPERATING
VALVE COMPANY**
6480 Epworth Boulevard
DETROIT • MICHIGAN



191



Model 165T



THE BRIDLE FOR
AIR HORSEPOWER

Comments From The Editor

Telling the world . . .

Somebody penned a fable about a maker of better mouse traps, to whose rustic door folks wore a beaten path.

It's a good story, but consider how much time could have been saved . . . how much better results might have been achieved by dotting the path with signs — "For better mouse traps, straight ahead".

If you make something better than your neighbors, you may count on local fame via word of mouth . . . but it will take the world a long while to find out about you unless you advertise. It's too tedious, too uncertain to wait for an article to advertise itself. Besides, some of your competitors will beat you to it.

The real purpose of advertising is to tell men you have something they need . . . and to continue reminding them of that fact. Consistent advertising coaxes in the orders . . . persistent advertising keeps them coming in.

Advertising can stimulate the growth of a new business—it can revive an old business, providing nothing is fundamentally wrong with the business or the product.

Advertising dissolves boundary lines . . . expands sales and profits. Advertising of the proper kind will sell anything worth the price asked for it.

On the road . . .

Rolling through the country, have you ever thought of men and roads?

There are broad, level, substantial highways leading direct to important destinations. Surely some of your acquaintances have similar attributes.

Some roads are narrow. They wind and wander, never seeming to get anywhere. Does that suggest any folks you've known?

Concrete, macadam, gravel, clay or sand. Surface qualities in men differ

as in roads. Some carry the loads . . . are solid and wear well. Others are of the shifty, sandy sort. Wet clay roads suggest slippery fellows . . . all right under normal conditions, but likely to turn a sharp corner in a business deal.

Some roads roll over the prairies. Others cross swamps. Some are blasted through ledges. Some climb and descend in roller-coaster fashion. Others detour frequently. The paths of some business men move along smoothly . . . with others the going is difficult. Some are alternately in the heights or the depths.

Traveling inspires queer thoughts some times.

The will to sell . . .

Where there is a will to sell, generally a way can be found.

It is like the determination that carries winners through strenuous athletic contests.

In business, it means the unremitting pursuit of prospects until the last lead has been followed through.

After repeated disappointments, some weaken and console themselves with the alibi that the business is not to be had. Under identical conditions, others persevere and win out.

Even in lean times, there is a tremendous amount of latent business in this great country, awaiting development by consistent advertising salesmen with the will to sell.

With a good product and the will to sell, the smallest business can prosper. Without this driving force, larger business concerns falter when the going becomes hard.

A genuine go-getter seldom wastes time about buying two-pants suits. He needs more is an extra pair of

TION

3281

WHAT'S NEW *in the industry*

by Wesley G. Paulson, Editor

LeBlond No. 3 Universal Cutter Grinder

Seven distinct new features are claimed to have been built into the new No. 3 LeBlond Cutter Grinder. These advances, contributing to faster cutting and grinding, greater precision, efficiency and convenience include:

1—New universal wheel head with three independent and co-ordinated planes of full circle movement, said to achieve a new degree of versatility and flexibility.

2—Variable speed transmission — a smooth, vibrationless drive delivering the proper cutting speed for any grinder wheel.

3—Selective speeds to spindle—four speeds, 3100, 4000, 5100 and 6500 r.p.m., provide proper latitude for every work requirement.

4—Universal table position — the special construction of the table makes it possible to present the work to the grinder wheel in any position or angle.

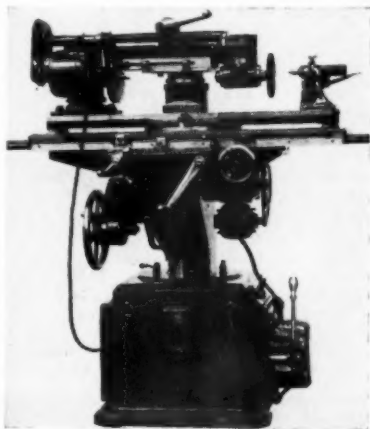
5—Operation of feeds—it is asserted that by means of advanced designing and engineering, the feeds are operated smoothly, precisely and quickly.

6—The work head — independently motored with a variable speed driving unit.

7—Long life construction—characteristic LeBlond sturdiness and durability have been carefully carried out in the No. 3 for long and useful life under rigorous use.

According to a bulletin issued by LeBlond, the No. 3 is the first really universal cutter grinder—designed for

faster sharpening and grinding with a new operating efficiency and new capacity for work. It offers quick set-ups for fast and correct sharpening of varied tool shapes, sizes and angles.



Previous efforts of the LeBlond Co., have led readers to expect something striking and unusual in the way of trade promotion literature. The new 3-color bulletin on the No. 3 cutter grinder is no exception. Mailed in the conventional 8½x11-inch size, with an attention-arresting die-cut cover, the bulletin unfolds to 21½x21¾ proportions, presenting a large scale view of the machine in which every part may

be scrutinized closely. In a column down one side, eight closeups show different grinding operations. On the reverse side, complete construction details and specifications are given.

Copies of the bulletin may be obtained by addressing the R. K. LeBlond Machine Tool Co., Cincinnati, O., and mentioning The BLUE BOOK.

Rousselle No. 1 Long Stroke Press

Bigger, heavier and stronger all the way through, the new No. 1 Rousselle supplements the No. 0 and offers increased capacity and new economies in deep draw work. It is adapted particularly for trimming deep die castings and all other forms of deep draw work within its capacity, formerly handled on large, heavy presses because of the long stroke required. Relieving the big presses of the smaller jobs frees them for other work and saves money because of the lower operating cost of the smaller units. The No. 1 is capable of high speed operation and with automatic feed, 10,000 operations per hour are possible. The non-repeat clutch stops after each



stroke, or can be adjusted to run continuously.

The No. 1 weighs 450-lbs. Crankshaft diameter at main bearings is 3 $\frac{3}{4}$ -inches. Flywheel is 16 $\frac{1}{2}$ -inches in diameter, weighs 120-lbs., and operating speed is 300-r.p.m. Standard stroke of ram is 2-inches, which is also the ram adjustment. Bottom of ram is 3x5 $\frac{1}{2}$ -inches. Ram to bed, stroke down, adjustment up is 6 $\frac{1}{2}$ -inches; size of hole in ram for punch is 1 $\frac{1}{4}$ -inches. Bed size is 8x12-inches. Depth of throat to center of ram is 4-inches. Size of opening between press frame at back is 6-inches. Inclination angle from right angle is 30-degrees. Height is 36-inches and bolster plate is one-inch thick.

Address David J. Ross Co., Benton Harbor, Mich., for further data on these versatile, low-priced presses.

New Niagara Bulletins

Niagara Machine & Tool Works, 637 Northland Ave., Buffalo, N. Y., announce bulletin 59-D covering their No. 101 bench presses. With capacity up to 2 tons and operating at 215 strokes per minute, these presses have a wide range of application for stamping small parts. They are available with table and legs for floor installation, or for bench mounting.

Bulletin 80-B illustrates and describes the new modern design of foot operated squaring shears as well as the complete line of hand operated rotary shears. Popular for semi-production operations, installation work and plant maintenance, these shears are favored for their portability and freedom from the necessity of power supply.



Glimpse into the metal stamping department of Curtiss-Wright Corp., equipped with a large number of Niagara presses and shears.

SAVE MONEY WITH THESE FAMCO PRESSES

Quality at low prices—sturdy accurately-made foot and arbor presses that will give efficient, dependable performance day after day.

Frames are of semi-steel—rams and pinions of specially selected steel—heavy stub tooth design to eliminate chance of breakage—square rack body to afford better bearing and eliminate side sway.



PLAIN LEVER TYPE

FAMCO Arbor Presses are available with plain lever, ratchet, compound ratchet and pilot wheel.

Special presses designed and built to meet your requirements.



RATCHET TYPE—ALSO AVAILABLE WITH PILOT WHEEL.

FAMCO Foot Presses are available in 6 popular sizes—a wide selection of throat depths and die spaces—stroke up to 4½ inches. These sturdy units are unexcelled for economical production of electrical appliance parts, jewelry, novelties, springs, radio parts, etc. *Quickmail Coupon No. 59 will bring full information and prices on the FAMCO line.*



FAMCO MACHINE CO.
RACINE, WISCONSIN

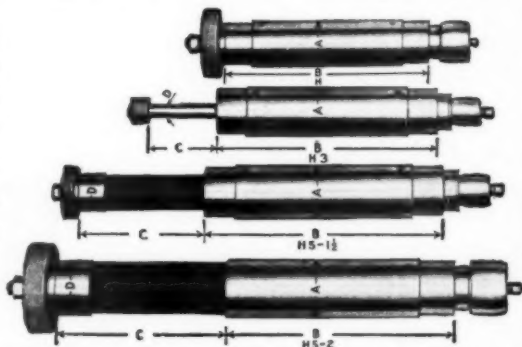
NEW YORK OFFICE AND WAREHOUSE—409 BROOME STREET, NEW YORK CITY

ANY GRINDER *is only as good as its spindle*

Accuracy, power, speed, long life—all depend on the spindle. That is why the Maxwell Grinder Spindle is being built differently—we call it *precision built*.

You judge.

Each spindle has 'two pairs' of precision ball bearings. The pair at the pulley end is mounted on a bronze sleeve whose sliding fit on the shaft compensates for expansion, contraction and wear.



The bearings are lapped individually, then in pairs. Next the two pairs are assembled and lapped as a unit. There's our idea of precision and the result is incomparable spindle performance. Maxwell spindles are adaptable to any grinding machine **AND THIS PERFORMANCE IS GUARANTEED.**



TYPE H MAXWELL UTILITY GRINDER

$\frac{1}{2}$ H. P. heavy duty, ball bearing motor—3450 r.p.m.—rubber mounted.

You may pay a lot more but no similar grinder can do more or better work . . . Our unconditional guarantee makes you the judge in your own shop.

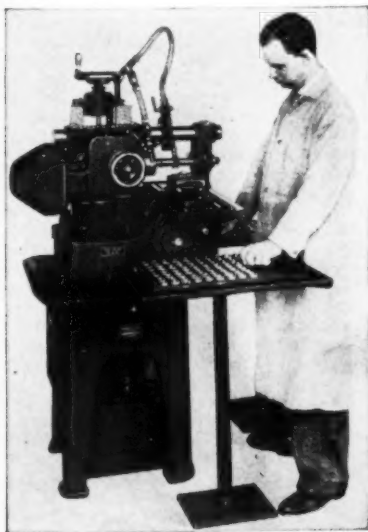
F. A. MAXWELL COMPANY

300 Broadway,

Bedford, Ohio

Brown & Sharpe No. 000 Plain Milling Machine

An automatic milling cycle with exceptionally rapid advance and return of the table features the No. 000 plain milling machine announced by Brown & Sharpe Mfg. Co., Providence, R. I. Designed specifically for the economical, rapid production milling of small pieces, its broad, independent ranges of speed and feed enable it to handle efficiently a wide variety of materials, using cutters down to the smallest end mills.



The table has a longitudinal movement of 4-inches. Sixteen rates of feed are provided, 9/16 to 24 3/4-inches per minute, and any desired rate is quickly obtained from front of table by change gears held on splined shafts by retainers mounted on the gear compartment door.

A convenient control button starts the automatic cycle of table movements. On completion, table stops in loading position. Fast travel forward at 365-in. per minute is engaged when

the table is started. The single table dog engages cutting feed within an accuracy of 1/16-in., reducing non-cutting time to the minimum; and on completion of the cutting feed, fast travel of 737-in. per minute is engaged automatically to return table to loading position in 1/3-second. Table reversal is dependably accurate to .002-in., a particular advantage in making "blind" cuts.

The alloy steel spindle has vertical adjustment of 6-in., and transverse adjustment of 2-in. Both adjustment hand-wheels are conveniently located.

Machine is furnished with either of two optional spindle speed ranges, viz., 160 to 3540 or 107 to 2340 r.p.m. 16 speeds are available. Spindle drive is by V-belt and cone pulleys, either direct or through reduction gears. The swivel mounting of the spindle motor gives easy release to the V-belt for quick selection of the speed desired. No change gears are required.

Set-up is simplified by positive indication of point of reversal of table. In addition, two nuts beneath left-hand

● DO YOU HANDLE?

CLARK Lift Jacks and Live Skids Will Save

*FASTER, EASIER—
Valuable Space Saved*

Racks, Bins and Tanks to Fit



**CASTER TYPE,
HEAVY DUTY AND
SPECIAL EQUIPMENT**

*Free handle
engaged.*

A line will bring full particulars.

**All Steel Welded Truck Corp.
ROCKFORD ILLINOIS**

No. 3879 1/2 Goggles
Leather Side ShieldIndustrial
EYE
Protectors**SELLSTROM EXCEL-QUALITY**

Styles specially adapted to comfort-needs of every working craft. Light weight—adjustable—ventilated—economical. WRITE for special information about Welders' Helmets, Goggles, Spectacles, Lenses and Respirators.

Sellstrom Mfg. Co., 646 N. Aberdeen St., Chicago

"POWERMASTER"**GIVES
YOU ...**

An infinitely variable speed range under instant finger-tip control—freedom from belt shifting and ability to locate machines exactly where desired, independent of lineshaft. Operation is speedier and more flexible and production costs are reduced.



"POWERMASTER" is readily attached to most machine tools with a simple four-bolt mounting.

UNCONDITIONALLY GUARANTEED—

Write for details and price

"POWERMASTER"

25 East Fourth St., New York, N.Y.

end give the table a 1-in. adjustment relative to the driving cam, providing for fine adjustment of the longitudinal position of the work with relation to the cutter at the point of reversal. Hand adjustment of the table is by means of a handcrank applied to a shaft inside the feed change gear cover at front of bed. Safety is assured by an electrical contact which disconnects power to table motor except when change gear cover is closed.

Smooth operation is characteristic of this machine, despite its great rapidity of table movement, due largely to the design of the single table driving cam, and to the clutch mechanism which engages cutting feed. Although a light, fast machine, there is adequate mass to absorb vibration, and ample rigidity in the stoutly-ribbed one-piece casting comprising bed and column.

Simple, direct drives for table and spindle are among the design features which make for long, trouble-free life. Anti-friction bearings are used entirely throughout spindle drive, and largely throughout table drive. Both the 1/3-h.p. spindle motor and 1/4-h.p. table motor are of the totally-enclosed, ball bearing type. Positive, automatic oiling of table ways and entire driving mechanism is provided by a cam-driven pump in bed, while spindle is effectively grease-lubricated through pressure fittings.

A coolant system, wash-out arrangement (for flushing out fixtures, etc.), arbor yoke, hinged arm brace arrangement and flanged vise are available as extras.

Address the makers for further details, and for your convenience, please use Quickmail Coupon No. 51.

**40 TYPES OF MEYLAN
STOP WATCHES****A watch for every purpose**

Let us send FREE 12 page folder No. 9H fully illustrating and describing some 40 types of stopwatches and accessories. No salesman will call.

**REPAIR
SERVICE**

} for all kinds of plain and complicated stopwatches.
Send to us for estimates; no charge, no obligation.

A. R. & J. E. MEYLAN, 266-68 West 40th St., New York City, N. Y.

"Specialists in timing instruments"



**A SIZE FOR
EVERY JOB**

ANGLE WORK EASY WITH PALMGREN ANGLE VISES

MADE IN 1½—2½—4—6—8 JAW SIZES

SEND QUICKMAIL COUPON NO. 58 FOR LITERATURE.

CHICAGO TOOL & ENGINEERING COMPANY

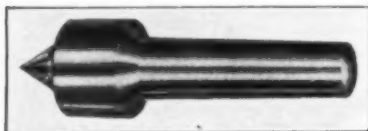
84th & MERRILL AVENUE

-3-

CHICAGO, ILLINOIS

Live Ball and Roller Bearing Center

Something said to be entirely new in an economical live ball and roller bearing center for lathes, hand screw machines, grinders and milling machines is offered by the Motor Tool Mfg. Co., 12281 Turner Ave., Detroit, Mich. Simplicity and sturdiness of construction adapt the device for heavy duty and assure long life.



The extra heavy spindle runs the full length with a large roller bearing in the front end for carrying radial loads, and another roller bearing in the extreme back end for free running and to maintain alignment so that the 60-degree point runs true and remains so.

BURR KEYSEATERS



Mill keyways in the run or on the ends of shafting already erected—save money on alteration, erection, and repair work.

Made in 4 sizes, for hand or motor operation.

Write for Bulletins and prices.

JOHN T. BURR & SON
429 Kent Ave., Brooklyn, N. Y.

It is asserted that the real heart of this center lies in the thrust ball bearing with its three point bearing—a vee and an angle—which eliminate chatter and end play. It is claimed that due to the sturdy construction, small head and short overhang, deflection of the point is overcome.

Centers are equipped with a special seal for retaining lubricant and excluding foreign matter for the life of the bearing.

Constructed of the best of bearing alloy steels, carefully hardened and precision ground, the individual rollers are held to within .0001 in., in diameter uniformity and straightness. Each spindle is individually ground to fit each bearing and run in on test before shipping.

A folder giving complete information and prices will be mailed on request. In writing please mention The BLUE BOOK.

Congress Standardized Drives

Standardized drives with pulleys "built to the belt"—that with the addition of variable pitch pulleys and flexible couplings comprises the line of the Congress Tool & Die Co., 9042 Lumpkin Ave., Detroit, Mich.

Pulleys are diamond bored, to within plus or minus .0005-in., balanced for smooth running and individually boxed. A wide range of sizes is carried in stock in "A" and "B" types, also the "R" type for round belts. Crown face pulleys for flat belts are also included in the line.

"Buy Economy — You'll Effect Economy"

**SOCKET HEAD
CAP SCREWS**

*Milled
from Bar*



**HOLLOW
SET SCREWS**

*Made of
Alloy Steel*

ECONOMY MACHINE PRODUCTS CO.
5207 LAWRENCE AVE. CHICAGO, ILL.

With the V step cone pulleys, center distance remains constant when changing belts, eliminating the nuisance of belt adjustment after each speed change.

The variable pitch pulleys, for use with A and B belts, are popular for air conditioning, stoker and other units where speed variation is essential. Speed variations of approximately 30% may be obtained by including a variable pitch pulley in the drive. Far greater variation may be obtained

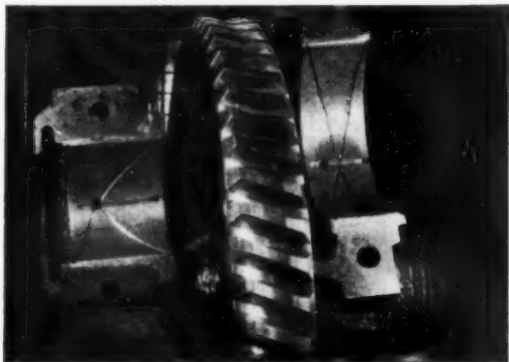
by using both pulleys of this type and by interchanging them on the motor and driven shafts.

The flexible couplings comprise two metal flanges with a non-metallic insert. The larger couplings have steel inserted driving lugs. Oil and water resisting inserts are available at a slightly higher cost.

Address the makers for copy of a four page bulletin giving specifications and prices, and please mention The BLUE BOOK.

Ideal Lubrication — Quiet Operation WITH TIMESAVER LAPPING COMPOUND

A scientific lapping compound especially prepared for the precise fitting of all types of Gears, Bearings, Pistons, Slides and Valves.



Elevator Gear and Bearings lapped with Timesaver Compound.

TIMESAVER COMPOUND will not imbed into any metal or continue to cut.
Grades for hard and soft metals.

Send Quickmail Coupon No. 44 for samples and literature.

TIMESAVER PRODUCTS CO.,

33 S. Desplaines St.,
Chicago, Ill.

BEFORE

DON'T DISCARD IT

Every time you discard a worn tool you are needlessly throwing away a large portion of your original investment—for worn tools are by no means useless. On the contrary, they can be **RENUed**—reworked into tools guaranteed as good as the original tool, in every way, and at a fraction of the original tool cost.

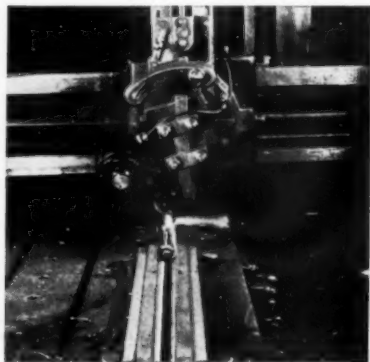
Renu TOOL CO.
275 E. MILWAUKEE AVE., DETROIT, MICH.

Renu IT!

AFTER

Something New in Mold Jobs

Here's a rather unusual tieup of a Dumore No. 5 grinder with V3 extension quill mounted in a George Gorton planer, grinding a mold to form rubber church pew tops. The job is out of the ordinary because of the necessity of maintaining a true and even surface over the five foot length of the mold. The job was done in one-third of the time required by the former hand scraper method and this application was worked out in the Wisconsin shops of Nelson Bros., & Strom, tool and die makers.



Genesee Tool Bulletin

The iron or "trade" tomahawk was the first real contribution to better tooling in this country. It was used mainly as a general purpose tool by the peaceful Senecas whose beautiful valley was the origin of the name Genesee.

This bit of information is taken from the cover of a four page bulletin issued by the Genesee Tool Co., Fenton, Mich. Various types of tools, cutters, end mills, circular saws, reamer, boring bar and cutter blades, flat forming tools, turning and facing tools, etc., are illustrated very attractively.

Address the makers for a copy of the bulletin, and please mention The BLUE BOOK.

**30
DAY
FREE
TRIAL**

Test It In Your Own Shop

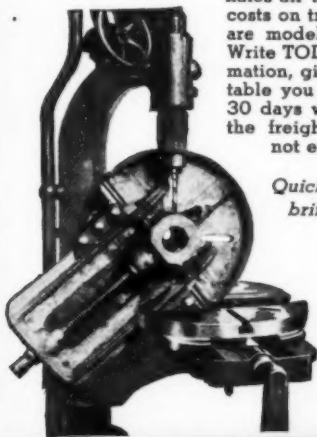
Prove

to Yourself That This MODERN COMBINATION DRILL TABLE

will save its cost in labor every six months. Study the operations shown . . . think of the time lost on similar jobs in your plant, handling difficult operations with blocks, clamps or awkward plates. **DON'T OVERLOOK THE CONSTANT CHANCE OF ACCIDENT IN HOLDING JOBS BY HAND.**

The Modern Combination eliminates all that. It cuts production costs on troublesome jobs. There are models for every drill press. Write **TODAY** for complete information, giving dimensions of the table you wish to replace. Test it 30 days without cost. We'll pay the freight both ways if you're not entirely satisfied.

*Quickmail Coupon No. 68 will
bring you the whole story.*

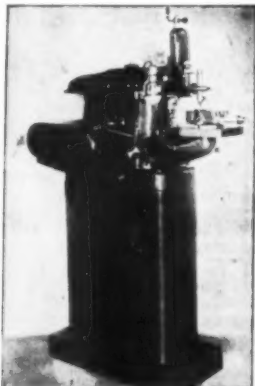


Manufacturers of the
"Modern" Cutting-Off Machine

MODERN MACHINE TOOL CO., JACKSON, MICHIGAN

Shapemaster Shaper

Sales Service & Mfg. Co., 3401 South 45th Ave., Minneapolis, offer the Shapemaster Shaper, a full universal machine for tool rooms, tool and die shops, etc. The unit has a maximum stroke of 7-inches with 45-67-97-140 strokes per minute. Cutting speeds are 0-125 feet per minute. The machine is V-belt driven. Motors from $\frac{1}{4}$ to $\frac{1}{2}$ h.p. capacity can be used. Motor is mounted on a hinged base and the guard is hinged to permit easy opening for changing speeds. Changes can be made while the machine is in motion.



Ways on the ram are protected by felt wipers. The bearings on the Shaper are all bronzed bushed having oil reservoirs for ample lubrication.

The main bull gear is of semi-steel, helically cut.

The table features are full universal and can be set to any position, permitting quick and easy set up for special and odd jobs.

The knee swivels to a full circle on the cross rail saddle.

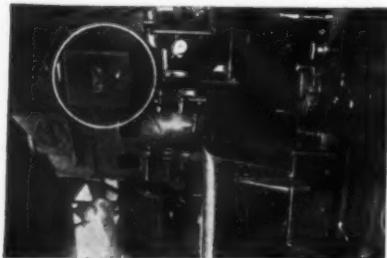
Table swivels to 240 degrees at the knee making it unnecessary to have an extra swivel vise and bringing the vise closer to the surface of the table. The knee is locked to the cross rail saddle by two tapered draw lock pins. The table also has the same locking features to the knee. The vise is of low base construction with inserted steel, heat treated jaws.

Shaper can be furnished in either the bench model or with a cabinet base.

All of the working surfaces are hand fitted.

Hobart Issues New Catalog

The Advanced Hobart Multi-Range Arc Welder is thoroughly covered in a new 24-page catalog issued by Hobart Brothers Co., Box TB-58, Troy, Ohio. Facts, figures and charts are given on the multi-range dual control, with an explanation of the advantages of the Hobart remote control. Other subjects covered are the polarity control, two-way meters and two-way ventilation. The various electric drive models are shown and the center spread is a thorough-going lesson in welding generator anatomy. The various gasoline driven generators are introduced, as well as Hobart welding accessories and electrodes. Address the makers for a copy of this interesting and attractive catalog.



MAGNETIC CHUCK USERS . . .

NEUTROL saves loss of time . . . prevents dunting, scoring and marring of work . . . magnetic chuck . . . prevents bruising knuckles . . . by releasing work completely and demagnetizing it. Available for all sizes of magnetic chucks . . . easily installed as it replaces existing switch and connects to same D. C. wires.

Write TODAY for full information.

Electro-Matic Products Co.
4820 DEMING PL.
CHICAGO, ILLINOIS

DRILL 75% FASTER

*Drills Stay Sharp
Longer!*

in concrete, tile,
brick, slate, plaster,
limestone, marble,
glass, carbon,
asbestos,
etc.

(Patented)

WITH
**WILEY'S
CARBIDE
TIPPED
DRILLS**



SPECIFICATIONS AND PRICES						
No.	Drill Diameter	Price Each	SHANK SIZE		Length Overall C	
			Diameter A	Length B		
R-1	1/4	\$3.50	5/64	3/8	2 1/2	
R-2	1/4	4.00	3/16	3/4	3 3/4	
R-3	5/16	4.50	1/4	3/4	3 3/4	
R-4	3/8	5.00	1/4	1	4	
R-5	1/2	5.50	3/8	1 1/4	6	
R-6	3/8	6.50	3/8	1 1/4	6	
R-7	3/4	8.00	3/8	1 1/4	6	
R-8	3/8	9.50	7/16	1 1/4	6	
R-9	1	12.00	7/16	1 1/4	6	
R-10	1 1/4	15.00	7/16	1 1/2	6	
R-11	1 1/2	18.00	1/2	1 1/2	6	
R-12	2	23.00	3/4	2	6	

Special sizes on request.

Your inquiry will bring full information promptly. Use Quickmail Coupon No. 66.

Here at last is a new patented carbide tipped drill specially designed for drilling holes in non-metallic materials, such as concrete, tile, brick, slate, plaster, limestone, marble, asbestos, wallboard, asphalt, glass, carbon, etc. It can be operated in a drill press, electric drill or hand brace at any number of revolutions per minute. No coolant is necessary.

The tip of the drill approaches the hardness of diamonds, yet it can be sharpened on any type and make of grinding machine and grinding wheel. Maintenance engineers find this drill useful for installing machines, as well as for many other applications.

Jobbers: Carry a complete stock of these drills to meet the growing demand for these exceptional tools.

Write for particulars.

WILEY'S CARBIDE TOOL CO.

1344 W. Vernor Highway,

Detroit, Michigan

BLUE BOOK RESULTS

"Inquiries received thru our ad in your BLUE BOOK *have surpassed our expectations.*"



That's what The Hamilton Tool Company say ... and their letter reproduced on the opposite page is typical of many received from satisfied BLUE BOOK advertisers.

The BLUE BOOK produces consistent, continued and profitable results for advertisers because of the effective manner in which it blankets the cream of the machine tool field ... reaching the men in authority ... the potential users of your tools and equipment throughout the world.

BLUE BOOK Rates are lowest in the field for comparable coverage.

Quickmail Coupon No. 50 will bring you statement of coverage and low rates.



HITCHCOCK PUBLISHING COMPANY

508 SOUTH DEARBORN ST.,

CHICAGO, ILLINOIS

"Surpass Expectations"



THE HAMILTON TOOL COMPANY

ENGINEERS AND MANUFACTURERS

HAMILTON, OHIO



SHARPENING OF



DIES AND FITTINGS
AND SPECIAL TOOLS



WHEELHAT SUPER
SENSITIVE DRILLING
AND TAPPING MACHINES



HAMILTON WILL CUT
HARDER FASTER



PORTABLE
DIVIDING TABLE
"MODELING"



PRINTING PRESSES
AND
SPECIAL MACHINES

August 16, 1939

Hitchcock Publishing Co.,
808 So. Dearborn St.,
Chicago, Ill.

Gentlemen:

We are very well pleased to inform you
that the inquiries received thru our ad in your
Blue Book have surpassed our expectations and we,
therefore request that you repeat the same Tapping
Machine Ad that is found on page 48 of your August
issue.

Very truly yours,

A. WHEELHART DIVISION
THE HAMILTON TOOL COMPANY

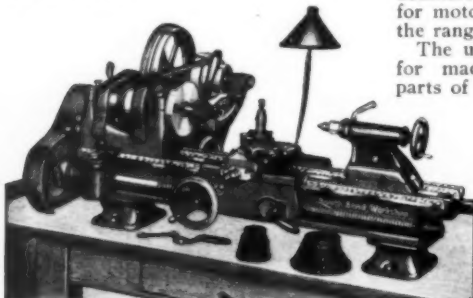
J. E. GROVE

3201AP

**BLUE BOOK reaches the
men in authority.**

South Bend 12-Speed 9-Inch Swing Precision Bench Lathe

A new 12-speed 9-inch swing precision bench lathe is announced by South Bend.



It provides spindle speeds ranging from 40 to 1200 r.p.m., cuts screw threads from 4 to 112 per inch, and has


power longitudinal turning feeds of .002 to .015-in. A hardened and ground $\frac{3}{4}$ -in. alloy steel headstock spindle with ball thrust bearing is standard equipment for precision machining at high speeds. The lathe has a $\frac{3}{4}$ -h.p. motor and adjustable horizontal countershaft, with two-step pulleys for motor and countershaft to provide the range of speeds.

The unit is especially recommended for machining very small diameter parts of steel, cast iron, brass, aluminum, etc. with the greatest accuracy and precision.

Other features are: twin gear reverse for right and left hand screw threads; a heavily designed saddle with adjustable gibs on the cross feed and compound rest; a precision lead screw guaranteed to meet the most exacting

requirements for cutting accurate screw threads on master taps, precision thread gauges, etc.; all gears cut from steel blanks; hand-scraped V-ways on lathe bed. The lathe takes 38 attachments for a variety of jobs, including: grinding, draw-in collet chuck work, milling, taper work, etc.

A new catalog No. 46-A has been issued illustrating, describing and pricing the new lathe, and containing valuable information on shop work. A free copy is available by writing to the Technical Service Dept., South Bend Lathe Works, South Bend, Indiana, mentioning this magazine.



Drill Grinding Attachment

fits Black & Decker and Van Dorn grinders, sharpens twist drills correctly. Price only \$18.

C. H. Carlson Mfg. Co.
13-15 Main St., N. E.
Minneapolis, Minn.

Write for bulletin

IT'S EASY

**THE
BEVERLY
SHEAR
CO.**

3007 W. 110th Place,
Chicago, Illinois



WITH A BEVERLY

Intricate jobs like these—cutting 14 gauge mild steel—are easy with a No. 1, 14-gauge BEVERLY. The smooth-cutting blades produce clean, sheared edges free from knurl. No. 1 BEVERLY weighs only 16½ lbs. No. 2 weighs 32 lbs., and cuts up to 10 gauge.

Write NOW for descriptive circulars and prices.

DESIGNED AND BUILT FOR--- *Exacting Mechanics* **Version JUNIOR PRESS BRAKES**

TRADE MARK

Command your every respect on all points—

Capacity

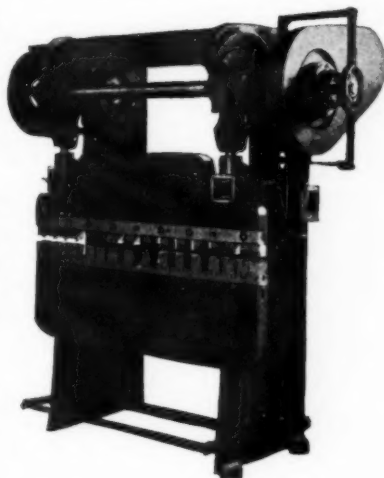
Bending capacity of these machines ranges from 32" x 14 gauge to 60" x 10 gauge. The tonnage capacity ranges from 22½ to 45 tons at the bottom of the stroke.

Performance

Light enough to be moved to the job, yet heavy enough to insure sharp straight bends on the full capacity range, these machines will handle your forming jobs **FASTER and MORE ECONOMICALLY.**

Dependability

They are designed and built by specialists in the manufacture of **POWER** operated forming, stamping and drawing equipment who **ORIGINATED ALL-STEEL WELDED CONSTRUCTION IN THE MANUFACTURE OF PUNCH PRESSES.**



Showing adjustable punch arrangement for light punching and perforating.

Value

1. Split-type **ADJUSTABLE** bronze bushed main bearings provide means of take-up.
2. Self-locking adjustment in the ram which simplifies die setting.
3. The bed is of two plate construction with a space between the plates for the slugs to fall through when multiple punching, notching, etc.
4. General design is the same as our Major series machines which are built in 30 sizes with capacities up to 1" thick plate. No differential is made because of the lower price.
5. The heavy plates minimize deflections, and all parts of machine are designed and built for **CONTINUOUS DUTY.**

Price

Prices begin at \$690.00 F.O.B. Chicago complete with motor and starter.

*You owe it to yourself and your company to REMEMBER **Version** WHEN YOU THINK OF FORMING*

WHY NOT INVESTIGATE THESE MACHINES?

VERSION ALLSTEEL PRESS CO.

9303 S. Kenwood CHICAGO, ILLINOIS

American H-2-30 Horizontal Hydraulic Broaching Machine

This pull type machine for light internal broaching operations has been redesigned using a fast return stroke and increasing the cycle time over the former models.

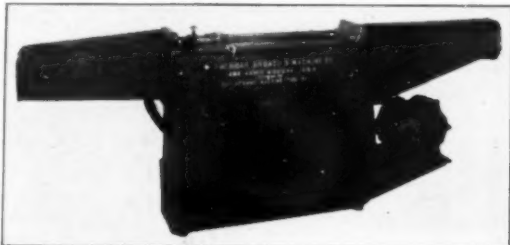
A Sundstrand pump unit has been added. Also hardened and ground steel guide ways, which are said to be unusual for a small, medium priced machine of this type.

The machine can be easily and quickly changed from one operation to another by changing work bushings, broach pullers and broaches.

Surface broaching operations can be handled satisfactorily by the addition of suitable fixtures and tooling.

Machine bed is heavy box section, well-ribbed to support machine members and guide ways for the draw head. Bed contains the hydraulic reservoir with the pumping unit submerged also the coolant tank and chip receptacle in a separate compartment.

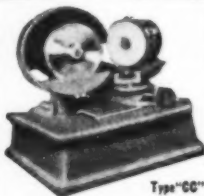
The draw head is long and well proportioned, with oil reservoir in its body.



The cycle is fast as dual cylinders are used with ram connections to the draw head, giving a steady, balanced pull on the cutting stroke and a fast return stroke.

Normal capacity is given as two tons. Maximum capacity, four tons. Stroke is 30-in., and maximum overall broach length 33-in. Draw head speed cutting is 28-ft. per minute and return speed 48-ft. per minute.

For additional information, address American Broach & Machine Co., Division of Sundstrand Machine Tool Co., Ann Arbor, Mich. They will be glad to send you copy of a new bulletin if you mention The BLUE BOOK.



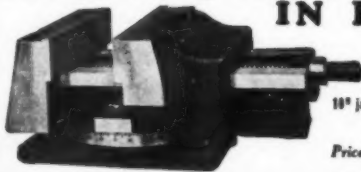
ROGERS Circular Knife Grinder

For circular or rotary knives up to 20" diameter. Unusually low price.

Type "CC" Write for bulletin CC.

S. C. ROGERS & CO.
205 DUTTON AVE., BUFFALO, N. Y.

SUPERIOR QUALITY AND WORKMANSHIP IN PLUNKET VISES



SQUARE BASE SHAPER VISE

The Shaper Vise has graduated base and tongue in center to fit slot in table, and has holes for bolting down. In ordering this vise give size of slots in Shaper Table, also distance from center to center of slots.

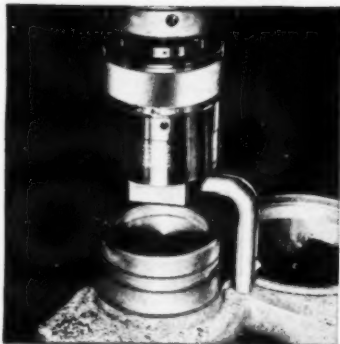
16" jaws, 2 1/4" deep, opens 8 1/2". Weight 125 lbs. \$46.80

Our complete line includes Vises for Drill Presses, Milling Machines, Shapers and Grinders.

Prices are net, f. o. b. Chicago. Write for illustrated folder today. Dealers wanted in unoccupied territory.

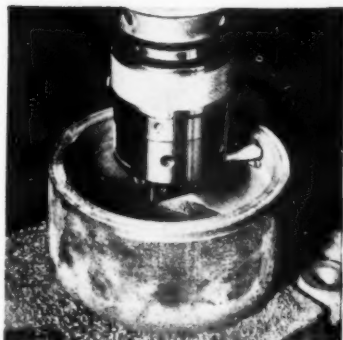
J. E. Plunket Machine Co. 1823 W. Lake Street
Chicago Illinois

ADJUSTABLE WHILE RUNNING!



Portions of a large experimental casting (4 x 5 feet) having nine hubs and bosses to be bored, faced, counterbored, chamfered, outside diameters turned, grooves cut inside and out, outside shoulders faced, undercut, etc. Accuracy and quick delivery were vital. Finished complete on Pratt & Whitney Jig Borer equipped with Precision Universal Tool Head. Time and cost about one-third of that required if wrench-adjusted plain boring heads had been used and makeshifts "rigged up" for turning, facing, etc.

How Does YOUR Shop Do Jobs Like These?



Pratt & Whitney have adopted the Precision Universal Tool Head and their Jig Borers are now specially arranged to fully utilize the versatility and speed of this indispensable tool.

THE PRECISION UNIVERSAL TOOL HEAD

brings all adjustments under absolute micrometric control of the operator at all times and all speeds **without stopping tool or machine**. It is the fastest and most accurate boring tool in existence. But more than that, it is truly universal. It faces, counterbores, turns outside diameters, mills, undercuts, recesses, backfaces, trepans and does a limitless range of "head-ache" jobs utterly impossible with wrench-adjusted "offset" boring tools because such tools cannot be cross-fed or adjusted while running.

Send Quickmail Coupon No. 60 for bulletins and additional information.

THE PRECISION TOOL COMPANY, Bridgeport, Conn.

Metallizing—A Maintenance First Aid

Spraying of molten metal (metallizing) is not new, but recent improvements in the art and equipment have reduced costs so that the process is becoming increasingly useful in the maintenance of machinery and equipment.

Worn parts such as shafts, pistons, valve mechanism, cylinders, wheel

hubs, bearings, etc., may be built up to their original size by spraying with steel or any other metal.

A further use of the process is to prevent corrosion by spraying on a protective coating of lead, zinc, bronze, stainless steel or other rustproof material.

The process is handled with a device resembling a paint spray gun. Three rubber hoses attach to the gun—one for oxygen, one for acetylene and one for compressed air. The compressed

air operates a small turbine which draws a 1/8-inch wire into the oxy-acetylene flame. The wire is melted as fast as it is fed and the molten material, in the form of a metal spray is blown onto the work.

The surface to be metallized must be roughened so the tiny metal particles will cling with a strong bond. Parts such as shafts are usually roughened by turning a rough thread on the surface to be built up. Other surfaces are usually roughened by blasting with sharp grit under high air pressure.

A modern metallizing plant, such as at the Tuthill Spring Co., 761 Polk St., Chicago, is equipped with a ventilated blasting room, spraying room, roughing and finishing lathes, surface grinders and special equipment for handling all shapes and sizes of objects to be metallized.

You Save Money with Dial Indicators by Saving...

**Wasted Material
Assembly Time
Inferior
Production
Customer
Satisfaction**

and you obtain...

**GREATER CONFIDENCE and
a BETTER PRODUCT**

Federal can offer you a wide selection of sizes and graduations and also many types of gauges equipped with Dial Indicators. Send for general catalog.

FEDERAL PRODUCTS CORP., 1144 EDDY ST., PROVIDENCE, R. I.

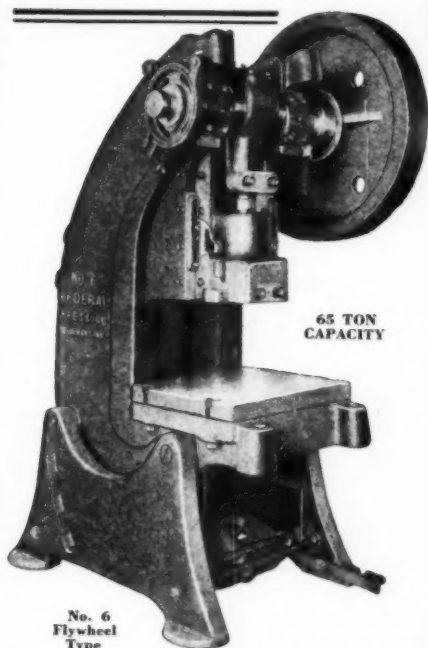
FEDERAL

PRECISION MEASURING INSTRUMENTS

Chicago • Cleveland • Detroit • West Hartford • Muncie
New York • Philadelphia • Pittsburgh • Rochester

Send Quickmail Coupon No. 46 for circular.





No. 6
Flywheel
Type

All models of Federal heavy duty presses are equipped with Timken roller bearings. Flywheel roller bearings are adjustable for wear—eliminating expensive rebuilding and repairs after long service and preventing damage to the clutch and control mechanism. Non-repeat safety type clutch and tripping device are also standard equipment—safeguarding against accidents to operators or dies in the event momentum should carry the crankshaft beyond center.

Send Coupon No. 32 for illustrated circular giving full information.

FEDERAL PRESS CO.

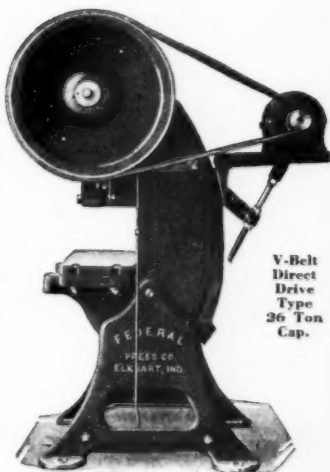
ELKHART, INDIANA

FEDERAL PRESSES

- ✓ *Accurate*
- ✓ *Dependable*
- ✓ *Durable*
- ✓ *Safer*
- ✓ *Lower in operating and maintenance costs*

Just a few of the many sound reasons why your press equipment should be—

FEDERAL



V-Belt
Direct
Drive
Type
36 Ton
Cap.

No. 3

Bench Lathe and Jig Borer Bulletins By Pratt & Whitney

The new Pratt & Whitney bench lathes in 7x16 and 10x20-in., sizes are introduced in a bright 2-color folder No. 443. The many attractive features, including such items as the Transitorq drive and cam-lock spindle nose are illustrated and described, with full specifications.

Bulletin No. 412-1, 16-pages in 3-colors, gives a very intimate presen-

tation of the No. 2A jig borer. Large, clear illustrations show every detail of machine and equipment and the text is comprehensive and illuminating. Both publications are attractive examples of modern sales literature. Address Pratt & Whitney, Division Niles-Bement-Pond Co., Hartford, Conn., for copies, and kindly mention The BLUE BOOK.

Miccro Supreme Stop-Off Lacquers

The Michigan Chrome Co., 6340 E. Jefferson Ave., Detroit, Mich., announce two new types of lacquers for insulating plating racks and for masking parts to be hard chromium plated. They are applied directly on the metal surface after thorough cleaning.

Racks protected with the insulating lacquer are said to have passed practically unaffected through the regular cycle of decorative plating. A 500 hour continuous immersion test in alkaline cleaner at 212° F., showed the coating still effective. The lacquer is claimed to resist acids; edges can be trimmed easily; excess can be removed with a thinner provided by this Company.

"The World's Largest Producer



You Don't Have to Wait



**WASHER
STOCK LIST**
listing
Over 2,000 Sizes

No need to suffer delays in getting your special washer needs. Simply select them from this new

of washers on hand for immediate shipment, including a complete range of all standard sizes as well as hundreds of other washers in a great variety of special sizes, materials, and finishes.

**WASHER
STOCK LIST**
listing
Over 2,000 Sizes

No need to suffer delays in getting your special washer needs. Simply select them from this new

of washers on hand for immediate shipment, including a complete range of all standard sizes as well as hundreds of other washers in a great variety of special sizes, materials, and finishes.

SENT FREE TO RESPONSIBLE FIRMS

Use Quickmail Coupon No. 49.

Wrought Washer Mfg. Co.

MILWAUKEE

2224 South Bay St.

WISCONSIN

Williams "Supersocket" Wrench Set and Torque "Measurrench"

J. H. Williams & Co., 75 Spring St., New York City, announce a new set of detachable "Supersockets" for use with hollow-screws. This set, composed of bits, parts and handles, is designed to replace the L shape wrenches of hex bar steel and provide greater speed and convenience in driving hollow-screws.



Set AL-101 includes 19 pieces: 10 bits for handling hollow (hex socket) set screws, $\frac{1}{4}$ to $1\frac{3}{8}$ -inch, and hollow cap screws, No. 8 to 1-inch. These bits have a knurled end for fast spinning of screws until they become tight enough to be turned with the handle, or driver. Also, 9 handles and parts, including 2 reversible "Superratchet" handles and Williams' new Torque "Measurrench", No. B-21. The



"Measurrench" provides an efficient tool for measuring right-hand turning torque and enables the operator to tighten hollow screws to the proper degree without danger of overload. Calibrated with numbers corresponding to numbers of the various size bits which it accommodates, when the index line on the bar touches the line indicating the piece number of the bit in use, the proper load has been applied to the hollow screw. Set is supplied in fitted steel case.

Complete information may be obtained by writing the manufacturer.

Vimco LIGHTS

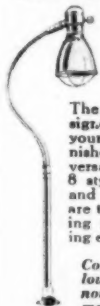
"THE SPOT"

Where You Need It Most!



Vimcolights put the light right on the job—where it is needed most. With proper Vimco-

lighting, your operators will produce more and better work — have fewer mistakes and accidents.



The lights are especially designed, not just adapted, to your particular needs. Furnished with 3 types of universal mounting brackets and 8 styles of sockets. Durable and attractive. Vimcolights are the choice of many leading manufacturers of metal-working equipment of various kinds.

Complete VIMCO equipment as low as \$1.55 to \$2.35. Order now or write for full information.

VIMCO MFG. COMPANY, Inc.
100 Chenango Street, Baitate, New York.

Reference Manual On Thor Screw Driver Bits and Socket Wrench Shanks

Complete specifications on bits for driving slotted head and Phillips recess-head screws and on socket wrench shanks and socket wrenches for all types of bolts and nuts, are presented in a new catalog and reference manual just issued by the Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago, Ill. This attractive new 24-page book, known as Catalog No. 70, describes bits and shanks for use with all models of Thor and other makes of power screw drivers and nut setters.

Fully illustrated with application pictures of tools in use on various kinds of jobs and with detail drawings of the bits, shanks and socket wrenches, this manual gives the experienced plant executive all the information he wants in convenient, concise form. A copy is available to users of power screw drivers and nut setters on request.

"Compar" Indicating Micrometer and Comparator

The George Scherr Co. announces a new indicating micrometer and comparator with several interesting and important improvements. Among these are the elimination of all gears and racks from the indicator mechanism. Instead, the knife-edge lever type is used for greater accuracy, increased durability and less sacrifice of precision through constant use.



The device eliminates the uncertainty of measuring "feel" since it includes a feature that makes the measuring pressure visible. There is an anvil relieving button which moves back the lower anvil for inserting and removing work. When the work is inserted and the button released, the anvil is pressed



HANDY RACKS SAVE TIME and MONEY

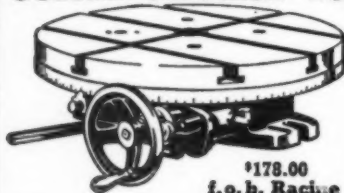
Tremendous capacity between the knees and shoulders of a man's height and in small floor space. No stooping, stretching or back-breaking. Very valuable in connection with supplying stock to automatic screw or parts-machines.

30 days approval if you wish.

Write today for details.

Wm. S. Yohe Supply Co.
583 Mahoning Rd. N. E., Canton, O.

Gorton Circular Table 215-1 -- 15" dia.



\$178.00
f.o.b. Racine

Handles a wide range of work. Adapted to frequent set-ups. Strongly constructed yet light enough for one man to handle. Adjustments outside — easily accessible. Precision-built. Accurate graduations. Totally enclosed, dust-proof, runs in oil.

Write for our Accessories Catalog.

George Gorton Machine Co.
1115 13th St., Racine, Wisconsin

against the work by a light pressure return spring. Thus no matter who does the measuring, the reading is sure to be the same. The human factor does not enter into it.

The spindle is hardened throughout, with the thread ground from solid material. Anvil faces are of cemented Tungsten Carbide alloys, giving a 40-times longer wear than hardened steel. The anvil faces are ground, lapped and polished plane and parallel to optical flat gages, accurate to .000012-inch.

The "Compar" indicating micrometer and comparator is constructed to withstand the constant wear and tear to which an instrument of this nature would be subjected in the machine shop and in quantity production. Delicate mechanism has been eliminated, resulting in a compact, sturdy instrument that measures in 1/10000-inch, and is built for hard, all-around use. The George Scherr Co., 128 Lafayette St., New York, are exclusive U. S. distributors.



STANDARDIZED JIG BUSHINGS

Prompt delivery from stock on over 10,900 standard items—over 6700 ACME Standard—over 4200 A. S. A. Standard—all completely finished ready for use. *Special sizes made to order.*

Made in our new plant by the most exacting and scientific methods—insuring accurate fit plus long wear—concentric within .0003" full indicator reading.

Send Quickmail Coupon No. 39
for bulletin containing complete data and low prices. Satisfactory service guaranteed.

Also manufacturers of complete machine parts, specializing in **hardened and ground parts** requiring **extremely close limits, lapped fits, etc.** also **hydraulic appliances** for pressures up to 20,000 lb. per square inch.

ACME Industrial Co.
210 N. LAFLIN ST., ✚ CHICAGO, ILL.

A New Reeves Catalog

Reeves Pulley Co., Columbus, Ind., announce a new 124-page catalog, G-384, covering the complete line of Reeves variable speed control equipment.

It is the first time all three Reeves speed control units — variable speed transmission, variable speed motor pulley and Motodrive — have been cataloged in a single book. Printed in two colors, each section has a different color combination for ready identification. Binding of the 8½x11 pages permits the open book to lie flat.

More than 200 illustrations are featured. Installation pictures are given on 12 pages. 53 pages are de-

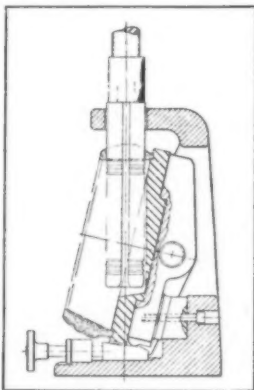


voted to useful engineering data.

Copies are available free from the head office, or local representatives.

Roller Bearing Cages For Streamliners Now Finish-Broached

Cages for roller bearings on some of the new streamlined Diesel trains are now being finished by broaching according to advices from Colonial Broach Co. The development is interesting in that broaching is generally considered as more of a mass production operation, while the parts in question are produced in relatively limited quantities.



To make the application economically feasible a special fixture and broach set-up were developed for broaching the several sizes of large cages required (having inside diameters of from 9 to 13-inches), on the same machine and fixture. In addition to variation in sizes, the cages also vary as to angular contact of rollers.

The operation is to broach the openings in the cages. A difficulty was that the cages had odd numbers of openings for rollers making it impossible for the broach to pass through the parts. Strip broaching was resorted to, using a rectangular broach, pushed through

You'll Save Time and Money

<p>THE JOB'LL BE HELD UP UNLESS WE GET THOSE BUSHINGS</p>	<p>THEY'LL BE HERE — I ORDERED THEM FROM EX-CELL-O YESTERDAY</p>
<p>THERE'RE PROBABLY IN THIS PACKAGE — EX-CELL-O SHIPS WITHIN TWENTY-FOUR HOURS</p>	<p>EX-CELL-O'S SERVICE SAVES US PLENTY</p>

EX-CELL-O
DRILL JIG BUSHINGS
EX-CELL-O CORPORATION • DETROIT

CATALOG 934-B ON REQUEST

the cage opening and returned to the top of the stroke in a single cycle. At the end of each cycle, the part is rotated to the next opening around the axis of locating pilot.

While sizes of openings had to be held to close tolerances, spacing between openings could be held to commercial tolerances, enabling use of the broach pilot itself for final index locating. This was facilitated by guide slots for the broach in the top of the fixture, close to the part itself, and by provid-

ing "lost motion" between ram and broach.

The main part of the fixture is pivoted, it will be noted, to accommodate different roller contact angle cages. Adapter plates and angle locating blades are provided for the different sizes. The combination while simple, has proven highly effective and should lend itself to other applications where small production quantities of different size large parts of similar design are required.

Increased Capacity—New Economies In Deep Draw Work

A NEW SMALL PRESS

The new No. 1 Rousselle supplements our No. 0 model, and is bigger, heavier and stronger all the way through. It is designed especially for trimming deep die castings and all other types of deep draw work formerly handled on large, heavy presses because of the long stroke needed. With automatic feed, 10,000 operations per hour are possible. NON-REPEAT clutch stops after each stroke or can be made to run continuously.

with a
**LONG
STROKE**

Check These Specifications:

Weight	450-lbs.
Crankshaft diameter at main bearings	3 $\frac{3}{4}$ "
Diameter of crankshaft	1 $\frac{1}{4}$ "
Flywheel weight	120-lbs.
Speed	300-r. p. m.
Diameter of flywheel	16 $\frac{1}{2}$ -inches
Ram standard stroke	2-inches
Adjustment of ram	2-inches
Size of bottom of ram	3x5 $\frac{1}{2}$ "
Ram to bed; stroke down adjustment up	6 $\frac{1}{2}$ "
Size of hole in ram for punch	1 $\frac{1}{4}$ "
Bed size	8x12"
Depth of throat to center of ram	4-inches
Size of opening between press frame at back	6-inches
Inclinable angle from right angle	30-degrees
Height	36-inches
Thickness of bolster plate	1-inch

The only inclinable punch press at these prices:

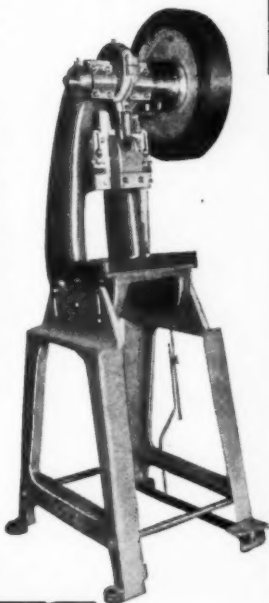
No. 0 Rousselle - - - \$100

No. 1 Rousselle - - - \$150

(less motor and stand; stand \$15 extra)

Quickmail Coupon No. 70 will bring bulletin giving complete information.

DAVID J. ROSS COMPANY
BENTON HARBOR, MICHIGAN



An Effective Way of Crowning Gear Teeth

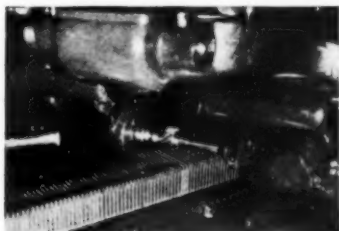
A simple method of crowning gear teeth in regular production is used by Warner Gear Co. Two dummy blades in the center of a Michigan Tool crossed-axis gear-finishing rack, are ground with a slight transverse taper so that the cutter blades on one end of the rack are angled a few tenths in one direction, and those on the other end a few tenths in the opposite direction.

The objective is to provide a minutely greater thickness at the center than at the ends of the teeth preventing concentration of tooth loads at the ends resulting from imperfect mating due to heat-treating warpage, unavoidable manufacturing and assembly variations, or possible minor shaft deflections under load, etc.

The idea was evolved from experiences with over-drive gears. In one

type of over-drive brought out in 1935, a total variation of .0002-in., was found to represent the difference between a good assembly and one that was too noisy to be acceptable. A special internal gear finisher was developed to crown the gear teeth automatically by interference cutting near the ends.

The next step was to crown the teeth of the pinion which meshed with this internal gear as well as with the sun gear of the planetary assembly, further improving noise characteristics.



Since, other methods of crowning gear teeth have also been tried with varying success. Dwelling at the ends of reciprocating strokes, in lapping finished gears, produces a certain amount of crowning, but has been difficult to control dimensionally, and, of course, is not applicable to unlapped gears.

Similarly, crowning by dwelling at the end of a cross-stroke in machining with rotary cutters has been found less practicable due to too great a dependence for amount of crowning on the sharpness of the cutters. Grinding half the blades of rotary cutters one

Save About One-Third

L-R FLEXIBLE COUPLING Type UX

A new coupling of great durability at a decided saving in first cost, because manufacturer will cast one element of the coupling as the fan hub. For motors 1/4 HP or less.

Write now for prices

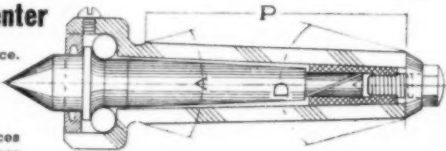
**LOVEJOY FLEXIBLE
COUPLING CO.**

5026 W. Lake St., Chicago, Ill.



Rigid Resilient Live Center

Built up to an ideal—not down to a price. Has no springs but is axially and radially resilient — has largest double duty bearing balls but smallest head and shortest overhang. Heaviest duty yet lightest running. Races are integral and immovable—threadless housing but thread-bound assembly within.



Write for complete information.

All Morse tapers carried
in stock.

Rigid Tool Holder Co. 2000 Witherell St., Detroit, Mich.

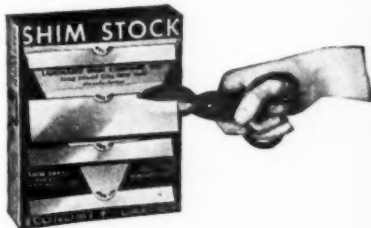
way and half another — similar in principle to that used on the rack—was found satisfactory but costly.

In effect the crowning of gear teeth reduces the chance of tooth breakage—since either the upper or lower helical gear is protected against load concentration at the weak end where the tooth flank forms an acute angle with the tooth end. The amount of crowning necessary to protect against this condition has been found to be quite small—some .0003 to .0004-inches being sufficient. With such crowned gears, tooth contact is generally found to extend about two-thirds to $\frac{3}{4}$ the entire tooth width, with the bearing area having a tendency to increase as the result of wear in service.

"Economy Carton" Simplifies Use of Shim Stock

An ingenious container introduced by Laminated Shim Company, Inc., Long Island City, N. Y., facilitates shop storage and use of thin brass shim stock.

Packed within the carton is an assortment of the shim stock sizes most often needed — thus keeping them in one convenient place. The assortment includes four rolls 50-inches long, in .001, .002, .003 and .005-inch thick-



nesses. This stock is a special shim brass by the makers of Laminum. The thin shim stock is pulled through the carton slots and cut off as needed. A tell-tale signal on each roll gives warning when that roll is nearly exhausted, and suggests early re-ordering.



Illustrating types MSG1 and MSG2, single reduction, multiple spur gear motorized speed reducers.

Motorized Speed Reducers

16 DIFFERENT STYLES

from which to select the exact type of speed reducer to meet your individual requirements.

1/30 to 7-1/2 H. P.

The diversity of the Janette custom built line of motorized speed reducers, enables us to supply a machine for almost any purpose.

Ask For Bulletin 22-25D

ROTARY CONVERTERS — MOTOR GENERATORS — BLOWER WHEELS

Janette Manufacturing Company

556-558 West Monroe Street Chicago, Ill. U. S. A.

Reeves Fluid Pressure Control

Reeves Pulley Co., Columbus, Ind., announces a new type of automatic and remote control for use with the Reeves vari-speed motodrive.

The motodrive is a speed control unit combining a driving motor, variable speed mechanism and reduction gears (where required) in a self-contained unit. It is built in five sizes, $\frac{1}{4}$ to 10 h.p. capacities, covering speed ratios from 2:1 through 6:1, in both horizontal and vertical designs.

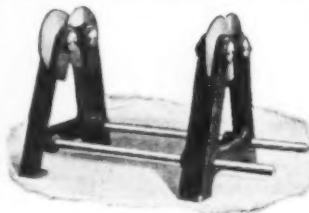
The new fluid pressure control is available for all motodrive units. It can be used to regulate speed automatically from pressure variation as in stoker feed on a boiler, maintenance of constant fluid pressure in a pipe line or tank upon which there is variable demand, uniform tension between machine sections or between a machine and rewinder, and similar requirements for automatic speed control. It may also be used as a manual Remote Control or as a

semi-automatic manual control in different ways.



The control comprises a bellows shifting mechanism mounted on the motodrive as shown, an adjustable pressure reducing valve located where desired, auxiliary valves if needed, and connecting pipes. Fluid pressure is transmitted by means of oil, water, steam, gas or air by a valve through piping to the bellows shifting mechanism.

ANDERSON Improved Balancing Ways



Every shop handling rotating parts needs this simple, sturdy, dependable device for balancing, straightening and truing operations. Saves time and trouble and assures better work.

Four chilled iron discs rotate with minimum friction on sensitive special bearings, giving a prompt, sure indication of whether or not the work is in perfect balance.

Write NOW for full information.

Swing	Greatest Distance Between Standards	Capacity in lbs.
20 in.	20 in.	1,000
40 in.	30 in.	2,000
60 in.	30 in.	2,000
72 in.	66 in.	5,000
96 in.	88 in.	10,000

ANDERSON BROS. MFG. CO., ROCKFORD, ILL.
1907 Kishwaukee St.

ism which operates to increase or decrease speed on the motodrive and hence on the driven machine.

Speed of shifting depends on the kind of fluid used. Air is fastest, and will shift the control over the widest (6:1) ratio through its complete speed range in from two to four seconds. Speed changes are smooth and gradual over the entire range of the unit and desired speed settings are maintained accurately and positively as long as desired. While the control is

very sensitive and is responsive to slight changes in pressure, the amount of pressure required varies with the size of motodrive. On the largest unit it ranges from 5 pounds per square inch (to start shifting the motodrive from minimum speed) to 30 pounds (to attain maximum speed). Pressure gauges may be used to indicate relative speed of the motodrive.

For further information address the makers—and please mention The BLUE BOOK.

Give Accurate Tools! "A Break"!

The best tools are hopelessly handicapped if spindles are inaccurate—besides, it's easy and simple to compensate for spindle misalignment with the . . .

ZIEGLER

ROLLER DRIVE FLOATING TOOL HOLDER

TAPPING

REAMING

COUNTER BORING

DIE HEAD FLOATING



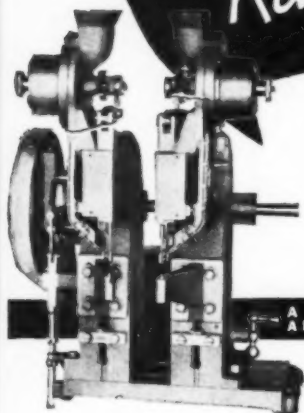
"IT ALWAYS FLOATS"

Holders furnished with either straight or Morse Taper Shanks. Special shanks and special holders furnished to meet all requirements.

Quickmail Coupon No. 69 will bring full information.

W. M. ZIEGLER TOOL CO., 1924 12th St., DETROIT

Industry's most
VERSATILE
Rivet Setter



The Answer To
Your Need For
LOWER COSTS

A TURN OF THE CRANK
ADJUSTS THE CENTERS

● It will sort, feed, insert and clinch 1 or 2 rivets at a time, as you choose—*automatically*. Adjustable riveting centers permit wide assembly application, giving advantage of volume production even on small volume work.

Send blueprint or sample assembly with inquiry.
Use Quickmail Coupon No. 34.

Chicago RIVET & MACHINE CO.
1855 So. 54th Avenue CHICAGO, ILLINOIS
Tubular and Split Rivets in All River Metals





This refers to your
ad in Sept. issue of
Hitchcock Blue Book

**HARDINGE
BROTHERS, INC.**
Elmira, N. Y.

1

This refers to your
ad in Sept. issue of
Hitchcock Blue Book

**BUFFALO FORGE
CO.**
161 Mortimer St.
Buffalo, N. Y.

9

This refers to your
ad in Sept. issue of
Hitchcock Blue Book

**ATLAS PRESS
CO.**
950 N. Pitcher St.
Kalamazoo,
Mich.

17

This refers to your
ad in Sept. issue of
Hitchcock Blue Book

**HARDINGE
BROTHERS, INC.**
Elmira, N. Y.

2

This refers to your
ad in Sept. issue of
Hitchcock Blue Book

**INTERIOR STEEL
EQUIPMENT CO.**
2352 E. 69th Street
Cleveland,
Ohio

10

This refers to your
ad in Sept. issue of
Hitchcock Blue Book

**BALDOR ELECTRIC
CO.**
4368 Duncan Ave.
St. Louis, Mo.

18

This refers to your
ad in Sept. issue of
Hitchcock Blue Book

SJOGREN MFG. CO.
Elmira, N. Y.

3

This refers to your
ad in Sept. issue of
Hitchcock Blue Book

**PROCUNIER SAFETY
CHUCK CO.**
14 S. Clinton St.
Chicago, Ill.

11

This refers to your
ad in Sept. issue of
Hitchcock Blue Book

**WYZENBEEK &
STAFF, INC.**
838 W. Hubbard
Ave.
Chicago, Ill.

19

This refers to your
ad in Sept. issue of
Hitchcock Blue Book

**CULLMAN WHEEL
CO.**
1359 Altgeld St.
Chicago, Ill.

4

Trial Order

**CHICAGO WHEEL
MFG. CO.**
1101 W. Monroe St.
Chicago, Ill.

12

This refers to your
ad in Sept. issue of
Hitchcock Blue Book

**ARMSTRONG BROS
TOOL CO.**
308 N. Francisco
Ave.
Chicago, Ill.

20

This refers to your
ad in Sept. issue of
Hitchcock Blue Book

**ARMSTRONG BLUM
MFG. CO.**
5741 Bloomingdale
Ave.
Chicago, Ill.

5

This refers to your
ad in Sept. issue of
Hitchcock Blue Book

HOBERT BROTHERS
Box TB-98
Troy, Ohio

13

This refers to your
ad in Sept. issue of
Hitchcock Blue Book

**ODIN UNIVERSAL
CORP.**
110 S. Dearborn St.
Chicago, Ill.

21

This refers to your
ad in Sept. issue of
Hitchcock Blue Book

PRATT & WHITNEY
Div. N-B-P Co.
Hartford, Conn.

6

This refers to your
ad in Sept. issue of
Hitchcock Blue Book

**WARD
MACHINERY CO.**
564 W. Washington
Chicago, Ill.

14

This refers to your
ad in Sept. issue of
Hitchcock Blue Book

**CHARLES L. JARVIS
CO.**
Middletown,
Conn.

22

This refers to your
ad in Sept. issue of
Hitchcock Blue Book

**SUNDSTRAND
MACHINE TOOL**
2535 Eleventh St.
Rockford, Ill.

7

This refers to your
ad in Sept. issue of
Hitchcock Blue Book

**BERKELEY
ENGINEERING CO.**
1381 E. 17th St.
Cleveland, O.

15

This refers to your
ad in Sept. issue of
Hitchcock Blue Book

**CONWAY CLUTCH
CO.**
1541 Queen City
Ave.
Cincinnati, Ohio

23

This refers to your
ad in Sept. issue of
Hitchcock Blue Book

**HANNA
ENGINEERING
WORKS**
1763 Elston Ave.
Chicago, Ill.

8

This refers to your
ad in Sept. issue of
Hitchcock Blue Book

SUTTON TOOL CO.
2842 W. Grand Bl.
Detroit, Mich.

16

This refers to your
ad in Sept. issue of
Hitchcock Blue Book

**RIVETT LATHE &
GRINDER, INC.**
Brighton
Boston, Mass.

24

X

17

Stick coupon on your letterhead and sign your name, title and firm name for complete information on the new Atlas shaper.

ATLAS PRESS CO.

9

Stick coupon on letterhead or postcard and sign name, title and firm for bulletin on the Buffalo No. 16 drill.

BUFFALO FORGE CO.

1

Stick coupon on your letterhead and sign your name, title and firm name for catalog on the Hardinge Bench Lathe Unit.

HARDINGE BROTHERS, INC.

18

Stick coupon on letterhead or postcard and sign name, title and firm for bulletin on Ball Bearing Grinders.

BALDOR ELEC. CO.

10

Stick coupon on your letterhead and sign your name, title and firm name for information on Interior Steel Shelving.

INTERIOR STEEL
EQUIPMENT CO.

2

Stick coupon on letterhead or Postcard and sign name, title and firm for bulletin on the Hardinge draw-in collets.

HARDINGE BROS., Inc.

19

Stick coupon on letterhead or postcard and sign name, title and firm name for catalog on the complete Wyco line.

WYZENBEEK & STAFF, Inc.

11

Stick coupon on letterhead or postcard and sign name, title and firm for information on the Tru-Grip tap holder.

PROCUNIER
SAFETY CHUCK CO.

3

Stick coupon on letterhead or postcard and sign name, title and firm for bulletin on the Sjogren collet chuck.

SJOGREN MFG. CO.

20

Stick coupon on letterhead or postcard and sign name, title and firm for catalog on Armstrong Bros. Tools.

ARMSTRONG BROS.
TOOL CO.

12

Stick coupon on letterhead or postcard and sign name, title and firm for Handee Grinders on 10 day trial.

CHICAGO WHEEL
& MFG. CO

4

Stick coupon on letterhead or postcard and sign name, title and firm for catalog on Cullman motor drives.

CULLMAN WHEEL CO.

21

Stick coupon on letterhead or postcard and sign name, title and firm for full information on Universal Vises.

ODIN UNIVERSAL CORP.

13

Stick coupon on letterhead or postcard and sign name, title and firm for information on the Hobart Arc Welder.

HOBART BROTHERS

5

Stick coupon on letterhead or postcard and sign name, title and firm for catalog on Marvel Hack Saws.

ARMSTRONG-BLUM
MFG. CO.

22

Stick coupon on your letterhead and sign your name, title and firm name for booklet describing Jarvis Tappers.

CHARLES L. JARVIS CO.

14

Stick coupon on your letterhead and sign your name, title and firm name for information on the Almar-Bittner power flanging machine.

WARD MACHINERY CO.

6

Stick coupon on your letterhead and sign your name and title for information on Kellerflie machines.

PRATT & WHITNEY
Div. N-B-P

23

Stick coupon on your letterhead and sign your name, title and firm name for bulletins on Conway clutches.

CONWAY CLUTCH CO.

15

Stick coupon on your letterhead and sign your name, title and firm name for information on Berkeley motor drives.

BERKELEY ENGINEERING CO.

7

Stick coupon on your letterhead and sign your name, title and firm name for circular on Sundstrand precision tools.

SUNDSTRAND MACHINE
TOOL CO.

24

Stick coupon on letterhead or postcard and sign name, title and firm for bulletin on Rivett Spring Tempered Collets.

RIVETT LATHE &
GRINDER, Inc.

16

Stick coupon on letterhead or postcard and sign name, title and firm for catalog on Diamond-Grip Collets.

SUTTON TOOL CO.

8

Stick coupon on your letterhead and sign your name, title and firm name for catalog on Hanna valves.

HANNA ENGINEERING
WORKS

41
Stick coupon on your letterhead and sign your name, title and firm name for catalog listing "Safety" socket screw products.

SAFETY SOCKET
SCREW CORP.

33
Stick coupon on your letterhead and sign your name and title for information on Haskins Air-Controlled Tapping.

R. G. HASKINS CO.

25
Stick coupon on your letterhead and sign your name, title and firm name for circular describing KRW arbor presses.

K. R. WILSON

42
Stick coupon on letterhead or postcard and sign name, title and firm for a catalog on the Whitney line of tools.

WHITNEY METAL TOOL CO.

34
Stick this coupon on a postcard or letterhead and mail to receive a rivet price list and illustrations of Chicago Automatic Rivet Setters.

CHICAGO RIVET &
MACHINE CO.

26
Stick coupon on letterhead or postcard and sign name, title and firm for your catalog on Flexible Shaft Machines.

N. A. STRAND & CO.

43
Stick this coupon on your letterhead and sign name, title and firm for catalog of Marshalltown presses.

MARSHALLTOWN MFG. CO.

35
Stick coupon on your letterhead and sign your name, title and firm name for catalog describing Ettco tappers.

ETTCO TOOL CO.

27
Stick this coupon on letterhead or postcard and sign name, title and firm for a circular on the Skilsaw portable sanders.

SKILSAW, INC.

44
Stick coupon on your letterhead and sign your name, title and firm name for information on Timesaver tapping compound.

TIMESAVER PRODUCTS CO.

36
Stick coupon on letterhead or postcard and sign name, title and firm for catalog on the L-W Line.

L-W CHUCK CO.

28
Stick coupon on your letterhead and sign your name, title and firm name for bulletin describing the Dremel Moto-Tool.

DREMEL MFG. CO.

45
Stick coupon on your letterhead and sign your name, title and firm name for catalog on Mauser precision tools.

GEORGE SCHERR CO.

37
Stick coupon on your letterhead and sign your name, title and firm name for information on the R & L Turning and Boring Tool.

R & L TOOLS

29
Stick coupon on your letterhead and sign your name, title and firm name for bulletins on Excello tools.

EX-CELL-O CORP.

46
Stick coupon on letterhead or postcard and sign name, title and firm for your new Catalog on Federal Test Indicators.

FEDERAL PRODUCTS CORP.

38
Stick coupon on your letterhead and sign your name, title and firm name for free catalog of the complete line of Standard gages.

STANDARD GAGE CO., INC.

30
Stick coupon on letterhead or postcard and sign name, title and firm for information on the Tornado Cleaner.

BREUER ELECTRIC MFG. CO.

47
Stick coupon on your letterhead and sign your name, title and firm name for bulletin on air operated chucks.

HANNIFIN MFG. CO.

39
Stick coupon on letterhead or postcard and sign name, title and firm for bulletin on Drill Jig Bushings.

ACME INDUSTRIAL CO.

31
Stick coupon on letterhead or postcard and sign name, title and firm for catalog on Wells metal cutting saws.

WELLS MFG. CORP.

48
Stick coupon on letterhead or postcard and sign name, title and firm for catalog on DeLuxe Handee Grinders.

CHICAGO WHEEL
& MFG. CO.

40
Stick coupon on letterhead or postcard and sign name, title and firm for information on the Schmidt Marking Machines.

GEO. T. SCHMIDT, INC.

32
Stick coupon on letterhead or postcard and sign name, title and firm for full information on Federal Presses.

FEDERAL PRESS CO.

This refers to your
ad in Sept. issue of
Hitchcock Blue Book

K. R. WILSON
16 Lock St.
Buffalo, N. Y.

25

This refers to your
ad in Sept. issue of
Hitchcock Blue Book

R. G. HASKINS CO.
4654 W. Fulton St.
Chicago, Ill.

33

This refers to your
ad in Sept. issue of
Hitchcock Blue Book

**SAFETY SOCKET
SCREW CORP.**
4442 N. Knox Ave.
Chicago, Ill.

41

This refers to your
ad in Sept. issue of
Hitchcock Blue Book

**N. A. STRAND
& CO.**
5001 N. Wolcott
Ave.
Chicago, Ill.

26

This refers to your
ad in Sept. issue of
Hitchcock Blue Book

**CHICAGO RIVET
& MACHINE CO.**
1855 S. 54th Ave.
Cicero P. O.
Chicago, Ill.

34

This refers to your
ad in Sept. issue of
Hitchcock Blue Book

**WHITNEY METAL
TOOL CO.**
Rockford, Ill.

42

This refers to your
ad in Sept. issue of
Hitchcock Blue Book

SKILSAW, INC.
Dept. A
3318 Elston Ave.
Chicago, Ill.

27

This refers to your
ad in Sept. issue of
Hitchcock Blue Book

ETTCO TOOL CO.
594 Johnson Ave.
Brooklyn, N. Y.

35

This refers to your
ad in Sept. issue of
Hitchcock Blue Book

**MARSHALLTOWN
MFG. CO.**
Marshalltown,
Iowa

43

This refers to your
ad in Sept. issue of
Hitchcock Blue Book

DREMEL MFG. CO.
5833 CT
Racine, Wis.

28

This refers to your
ad in Sept. issue of
Hitchcock Blue Book

L-W CHUCK CO.
1-7 N. St. Clair St.
Toledo,
Ohio

36

This refers to your
ad in Sept. issue of
Hitchcock Blue Book

**TIMESAVER
PRODUCTS CO.**
33 S. Desplaines St.
Chicago, Ill.

44

This refers to your
ad in Sept. issue of
Hitchcock Blue Book

EXCELLO CORP.
1188 Oakman Blvd.
Detroit, Mich.

29

This refers to your
ad in Sept. issue of
Hitchcock Blue Book

R & L TOOLS
1825 Bristol St.
Philadelphia, Pa.

37

This refers to your
ad in Sept. issue of
Hitchcock Blue Book

**GEORGE SCHERR
CO.**
122 Lafayette St.
New York, N. Y.

45

This refers to your
ad in Sept. issue of
Hitchcock Blue Book

**BREUER ELECTRIC
MFG. CO.**
5108 N.
Ravenswood
Chicago, Ill.

30

This refers to your
ad in Sept. issue of
Hitchcock Blue Book

**STANDARD GAGE
CO. INC.**
Poughkeepsie,
New York

38

This refers to your
ad in Sept. issue of
Hitchcock Blue Book

**FEDERAL PRODUCTS
CORP.**
1144 Eddy St.
Providence,
R. I.

46

This refers to your
ad in Sept. issue of
Hitchcock Blue Book

WELLS MFG. CORP.
315 Seventh Ave.
Three Rivers,
Mich.

31

This refers to your
ad in Sept. issue of
Hitchcock Blue Book

**ACME INDUSTRIAL
CO.**
210 N. Laflin St.
Chicago, Ill.

39

This refers to your
ad in Sept. issue of
Hitchcock Blue Book

**HANNIFIN MFG.
CO.**
621 S. Kolmar Ave.
Chicago, Ill.

47

This refers to your
ad in Sept. issue of
Hitchcock Blue Book

**FEDERAL PRESS
CO.**
Elkhart, Ind.

32

This refers to your
ad in Sept. issue of
Hitchcock Blue Book

**GEO. T. SCHMIDT
INC.**
1802 Belle Plaine
Ave.
Chicago, Ill.

40

This refers to your
ad in Sept. issue of
Hitchcock Blue Book

CATALOG

**CHICAGO WHEEL
MFG. CO.**
1101 W. Monroe St.
Chicago, Ill.

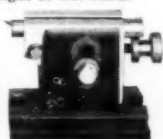
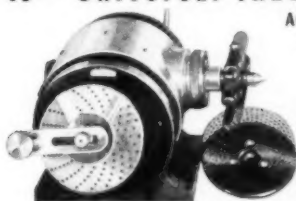
48

OUTSTANDING TOOL VALUES

10 1/2" Universal Index Centers

ACTUAL SWING 11"

Can be furnished right or left hand.



A new universal dividing head designed to give the utmost in a well-balanced, rigid and accurate index center. All materials and workmanship are of the highest grade. Head stock is swivel and graduated up to 180 degrees. Head can be tilted above and below vertical and perpendicular lines. Spindle has taper bearing and is provided with take-up collar for end thrust. No. 10 B. & S. taper has large hole through spindle. **\$125**

10 1/2" Full Universal Dividing Head

Index Centers for Universal Milling Machines



Can be furnished right or left hand. Actual Swing 11" **\$185**

For all kinds of indexing and spiral cutting. Swivel head stock is graduated to 180 degrees and can be tilted above and below the perpendicular. Spindle has No. 10 B. & S. taper front and back with tapered bearing and thrust collar.

L-W MAGNETIC CHUCK

Waterproof for wet or dry grinding
A REAL MAGNETIC CHUCK that is adaptable for any purpose. Unconditionally guaranteed to furnish the highest magnetic holding power on either 110 or 220 volt direct current. Well designed and beautifully finished, highest quality workmanship throughout—complete with cord and plug—an outstanding value **\$45**

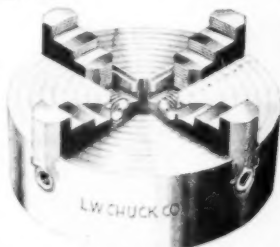
Also made in the following sizes:

6 1/2" x 18"—\$60 8" x 24"—\$110

10 3/4" x 37"—\$195

4-Jaw Independent Lathe Chucks (made in 5 sizes)

Semi-steel construction with heavily ribbed body to withstand unusual



strains. Ground finish. Four independent jaws made of accurately ground and fitted hardened steel. Reversible. Has 1 1/4" tough nickel steel screws. 12" size, weight 75 lbs.

14" independent chuck **\$38.00**
12" independent chuck **33.50**
10" independent chuck **29.00**



Working Surface 5 3/4" wide, 13" long. Consumes .5 Amp.

L-W also manufactures power saws, demagnetizers, vises, etc. Send Quickmail Coupon No. 36 for a catalog of the complete L-W line.

L-W CHUCK CO.

1-7 N. ST. CLAIR ST.,

TOLEDO, OHIO

HANDEE

SATIN SM FAST AS

- Since it was originated eight years ago, Handees have been put to work in mechanical shops, repair rooms, laboratories, etc.
- Actually, a Whole Shop Full of tools can be operated wherever there is a power source, some shafting, pulleys, etc. in any AC or DC outlet, (110 or 220 volts).
- Uses 200 different accessories available in easy-working chuck.

GRINDS CUTS SA
DRILLS ROUTS SA
POLISHES CARVES SH

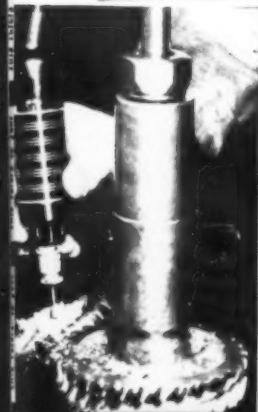
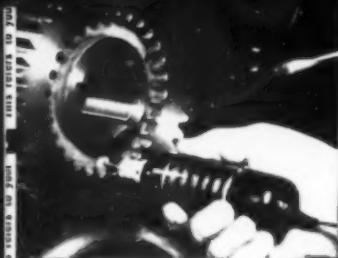
- Does precision work on delicate work, repairs machine parts, mantling machine, used on precision work. Indispensable for work on all materials: glass, plastics, wood, stone, brass, etc.

Try a Handee. You'll find it the fastest, most powerful tool for its weight. 12 ounces.

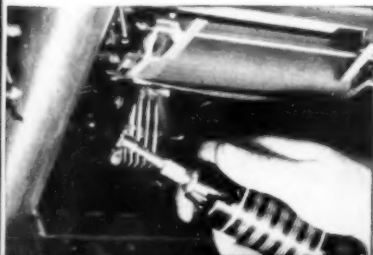
Order on 16-Days
Send for Catalog

Copyright Chicago Wheel & Tool Co.

CHICAGO WHEEL & TOOL CO.
Makers of Quality Tools
1101 W. MONROE ST. CHICAGO, ILL.



Reaches those hard-to-get-at places. Its light weight and ease of handling in any position save time on a wide range of operations.



CHICAGO WHEEL & TOOL CO. 1101 W. MONROE ST. CHICAGO, ILL. 60604

EE

TOOL OF 1001 USES

SMOOTH and LIGHTNING

Eight years ago, thousands of Handees
in metal working shops, factories, tool
laboratories, etc.

Full of Tools in One, the Handee can
do anything there is an electric outlet. No cumber-
some tools, etc. required. Just plug the Handee
into a 110 volts and let her go!

Accessories, quickly interchange-
able.

SANDS ENGRAVES
SAWS CLEANS
SHARPENS ETC.

on delicate mechan-
ical parts without dis-
torting production lines.
Works on all metals, alloys,
stone, bone, etc.

Will find it the finest,
most useful tool for its type and

10-Days Trial or
Return for Catalog.

Chicago Wheel & Mfg. Co.

CHICAGO WHEEL & MFG. CO.

Producers of Quality Products for 40 Years

1100 N. Dearborn St. Dept. BB CHICAGO, ILL.



*This
Picture
is
Actual
Size*

De Luxe
Model

\$1850

Postpaid

6 Accessories Free

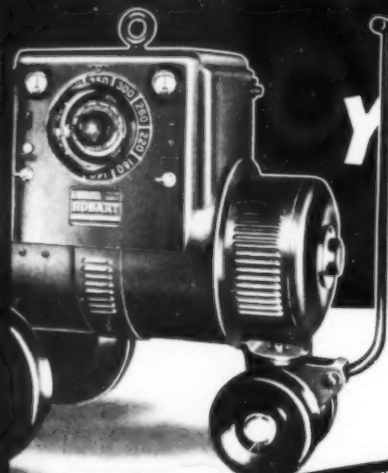
For **FREE CATALOG**
Use Coupon No. 48

For **TRIAL OFFER**
Use Coupon No. 12

HERE'S A NEW TOOL THAT

WILL CUT YOUR COSTS

SQUARELY IN TWO in PATTERN WORK-TOOL ROOM- MAINTENANCE-PRODUCTION-SALVAGE



30 Days Trial
ON YOUR OWN WORK
AT OUR RISK TO PROVE
PROFITS WILL PAY FOR IT

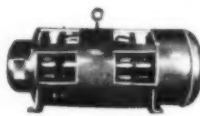
SIMPLIFIED ARC WELDING

Makes possible enormous savings in the construction of jigs, tools and dies. 90% of the low cost tooling up in shops today is arc welded. Large savings come in the elimination of patterns, breakable castings and expensive hand work of old methods. The saving in time alone quickly pays for a Hobart Welder that your own men can use. Brings money saving advantages that were unheard of years ago on maintenance, production and salvage work. You owe it to yourself to see what simplified welding really means to you on your own work. Check the coupon below or send Quickmail Coupon No. 13 for the new book entitled "New Profits in Arc Welding" — it's FREE.



PLATING MOTOR GENERATORS

Hobart specializes in low voltage Motor Generator Sets that are ideally suited for electroplating. Available in capacities ranging from 100 amperes at 60 volts for the custom shops to 50 amperes at 6 volts for plating operations. The equipment is of proper design insuring maximum efficiency and economical operation. Write for prices.



SPECIAL DUTY MOTOR GENERATORS

Hobart Motor Generators are manufactured for such special requirements as motion picture projection, chlorinating water, telephone service, etc. In other words, we are in a position to build DC Generators to your specifications. You'll be money ahead if you check Hobart's low prices before you buy. Ask us for quotations on your requirements.



INDUSTRIAL BATTERY CHARGERS

With the rapidly increasing use of Electric Trucks in factories there is a growing demand for Battery Chargers. Hobart's Constant Potential Generator is the answer for quick dependable charging. Tell us the make of industrial battery you are using; the type of cell and number; plates per cell and capacity, for a quotation on automatic equipment.



GRINDERS AND BUFFERS

Hobart offers a real bargain in the 2, 3 and 5 HP Pedestal Type Buffers and Grinders. They are ideal for buffing and polishing but are especially adapted to general-purpose grinding. Of fabricated steel construction, and ball bearing mounted they are less expensive not only in first cost but for operation and maintenance. Write for attractive new low prices.

PROVE WITH 30 DAYS TRIAL

HOBART BROTHERS COMPANY, Box TB-98 Troy, Ohio

Without obligation send me full information on the new "Multi-Purpose" Arc Welder and terms I've checked.

I am interested in ☐ Amp Welder ☐ 30 Days Trial ☐ Easy Terms
☐ Electric Drive ☐ Gas Engine Drive ☐ "Build Your Own"

Name _____

Address _____

Send me ☐ New Catalogue ☐ Book "New Profits in Arc Welding"

☐ Industrial Battery Charger

☐ Plating Motor Generator

☐ Special Motor Generator

☐ Pedestal Buffer and Grinder

FREE BOOKS
TELL YOU HOW TO
INCREASE PROFITS



This refers to article
This refers to article
This refers to your
This refers to your
This refers to article
This refers to your

<p>This refers to your ad in Sept. issue of Hitchcock Blue Book</p> <p>Sept. 1938</p>	<p>WROUGHT WASHER MFG. CO. 2224 South Bay St. Milwaukee, Wis.</p> <p>49</p>	<p>This refers to your ad in Sept. issue of Hitchcock Blue Book</p> <p>57</p>	<p>CONGRESS TOOL & DIE CO., INC. 9042 Lumpkin Ave. Detroit, Mich.</p>	<p>This refers to your ad in Sept. issue of Hitchcock Blue Book</p> <p>65</p>	<p>R. G. HASKINS CO. 4654 W. Fulton St. Chicago, Ill.</p>
<p>This refers to article in Sept. issue of Hitchcock Blue Book</p>	<p>HITCHCOCK PUBLISHING CO. 508 S. Dearborn St. Chicago, Ill.</p> <p>50</p>	<p>This refers to your ad in Sept. issue of Hitchcock Blue Book</p> <p>58</p>	<p>CHICAGO TOOL & ENGINEERING CO. 84th & Merrill Ave. Chicago, Ill.</p>	<p>This refers to your ad in Sept. issue of Hitchcock Blue Book</p> <p>66</p>	<p>WILLEY'S CARBIDE TOOL CO. 1344 W. Vernor Highway Detroit, Mich.</p>
<p>This refers to article in Sept. issue of Hitchcock Blue Book</p>	<p>BROWN & SHARPE MFG. CO. Dept. 43 Providence, R. I.</p> <p>51</p>	<p>This refers to your ad in Sept. issue of Hitchcock Blue Book</p> <p>59</p>	<p>FAMCO MACHINE CO. Racine, Wis.</p>	<p>This refers to your ad in Sept. issue of Hitchcock Blue Book</p> <p>67</p>	<p>DELTA MFG. CO. 671 E. Vienna Ave. Milwaukee, Wis.</p>
<p>This refers to article in Sept. issue of Hitchcock Blue Book</p>	<p>LANDIS MACHINE CO. Waynesboro, Penna.</p> <p>52</p>	<p>This refers to your ad in Sept. issue of Hitchcock Blue Book</p> <p>60</p>	<p>PRECISION TOOL CO. Bridgeport, Conn.</p>	<p>This refers to your ad in Sept. issue of Hitchcock Blue Book</p> <p>68</p>	<p>MODERN MACHINE TOOL CO. Jackson, Mich.</p>
<p>This refers to article in Sept. issue of Hitchcock Blue Book</p>	<p>RELIANCE ELECTRIC & ENGINEERING CO. 1042 Ivanhoe Road Cleveland, Ohio</p> <p>53</p>	<p>This refers to your ad in Sept. issue of Hitchcock Blue Book</p> <p>61</p>	<p>ROSS OPERATING VALVE CO. 6480 Epworth Blvd. Detroit, Mich.</p>	<p>This refers to your ad in Sept. issue of Hitchcock Blue Book</p> <p>69</p>	<p>W. M. ZIEGLER TOOL CO. 1924 12th St. Detroit, Mich.</p>
<p>This refers to your ad in Sept. issue of Hitchcock Blue Book</p>	<p>TURNER UNI-DRIVE CO. 1638 Central St. Kansas City, Mo.</p> <p>54</p>	<p>This refers to article in Sept. issue of Hitchcock Blue Book</p> <p>62</p>	<p>BARBER-COLMAN CO. Rockford, Ill.</p>	<p>This refers to your ad in Sept. issue of Hitchcock Blue Book</p> <p>70</p>	<p>DAVID J. ROSS CO. Benton Harbor, Mich.</p>
<p>This refers to article in Sept. issue of Hitchcock Blue Book</p>	<p>ALOFS MFG. CO. 1615 Madison Ave. S. E. Grand Rapids, Mich.</p> <p>55</p>	<p>This refers to your ad in Sept. issue of Hitchcock Blue Book</p> <p>63</p>	<p>COLONIAL BUSHINGS, INC. 147 Jos. Campau Detroit, Mich.</p>	<p>This refers to your ad in Sept. issue of Hitchcock Blue Book</p> <p>71</p>	<p>DURO METAL PRODUCTS CO. 2651 N. Kildare Ave. Chicago, Ill.</p>
<p>This refers to your ad in Sept. issue of Hitchcock Blue Book</p>	<p>MALL TOOL CO. 7742 So. Chicago Ave. Chicago, Ill.</p> <p>56</p>	<p>This refers to your ad in Sept. issue of Hitchcock Blue Book</p> <p>64</p>	<p>LINCOLN ELECTRIC CO. Dept. AD-525 Cleveland, Ohio</p>	<p>This refers to your ad in Sept. issue of Hitchcock Blue Book</p> <p>72</p>	<p>M. A. FORD MFG. CO. 413 Pershing Ave. Davenport, Iowa</p>

65

Stick coupon on your letterhead and sign your name, title and firm name for a catalog on Haskins Flexible Shaft Equipment.

R. G. HASKINS CO.

67

Stick coupon on your letterhead and sign your name, title and firm name to receive a bulletin describing Congress drives.

CONGRESS
TOOL & DIE CO., INC.

49

Stick coupon on your letterhead and sign your name, title and firm name to receive your copy of the washer stock list.

WROUGHT
WASHER MFG. CO.

66

Stick coupon on your letterhead and sign your name, title and firm name for information on Willey's carbide tipped drills.

WILEY'S CARBIDE TOOL CO.

58

Stick coupon on your letterhead and sign your name, title and firm name for literature describing fine Palmgren angle vises.

CHICAGO
TOOL & ENGINEERING CO.

50

Stick coupon on your letterhead and sign your name and title for information on why Blue Book advertising is a better "buy."

HITCHCOCK
PUBLISHING CO.

67

Stick coupon on letterhead or postcard and sign name, title and firm for catalog on Delta tools.

DELTA MFG. CO.

59

Stick coupon on your letterhead and sign your name, title and firm name for information on Famco foot and arbor presses.

FAMCO MACHINE CO.

51

Stick coupon on your letterhead and sign your name, title and firm name for information on the B. & S. No. 000 plain milling machine.

BROWN & SHARPE MFG. CO.

68

Stick coupon on your letterhead and sign your name, title and firm name for information on the Modern combination drill table.

MODERN
MACHINE TOOL CO.

60

Stick this coupon on a postcard or letterhead to receive data on the Precision Tool Head.

PRECISION TOOL CO.

52

Stick coupon on your letterhead and sign your name, title and firm name for information on the Lanhydro double end threading machine.

LANDIS MACHINE CO.

69

Stick coupon on your letterhead and sign your name, title and firm name for information on the Ziegler floating tool holder.

W. M. ZIEGLER TOOL CO.

61

Stick coupon on your letterhead and sign your name, title and firm name for catalog No. 37 describing Ross Valves.

ROSS OPERATING VALVE CO.

53

Stick coupon on your letterhead and sign your name, title and firm name for information on the Reliance reversing motor drive.

RELIANCE ELECTRIC &
ENGINEERING CO.

70

Stick coupon on your letterhead and sign your name, title and firm name for information on the Rousselle punch press.

DAVID J. ROSS CO.

62

Stick coupon on your letterhead and sign your name, title and firm name for bulletin illustrating the Barber-Colman cutter and hob sharpening machine.

BARBER-COLMAN CO.

54

Stick coupon on your letterhead and sign your name, title and firm name for information on the Turner Uni-Drive.

TURNER UNI-DRIVE CO.

71

Stick coupon on your letterhead and sign your name, title and firm name for information on the Duro high speed grinder.

DURO METAL PRODUCTS CO.

63

Stick coupon on letterhead or postcard and sign name, title and firm for information and prices on Colonial Bushings.

COLONIAL BUSHINGS, INC.

55

Stick coupon on your letterhead and sign your name, title and firm name for information on the Alofs demagnetizer.

ALOFS MFG. CO.

72

Stick coupon on your letterhead and sign your name, title and firm name for catalog of Ford hand cut rotary files.

M. A. FORD MFG. CO.

64

Stick coupon on your letterhead and sign your name, title and firm name for bulletin on the Lincoln machine shop welder.

LINCOLN ELECTRIC CO.

56

Stick this coupon on a postcard and sign name, title and firm name to get catalog on Mall Power Tools.

MALL TOOL CO.

ead
and
py

ead
for
ok
r.

ad
nd
on
ll-

O.

ad
nd
on
d

d
d
on
or

d
d
n

d
d
n

...

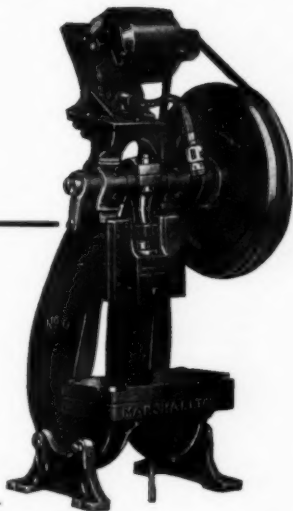
...

>

MARSHALLTOWN

**No.
O**

**BENCH
PRESS**



★
**OPEN
BACK**

★
INCLINABLE



★
**IMPROVED
BALL AND
SOCKET
CONNECTION**



A HEAVIER BUILT PRESS THAT'S "TOPS" IN QUALITY

Here's a press that is built and engineered to give outstanding performance on production schedules. The No. O has improved ball and socket connection—heavier construction—more die space and easier adjustment. Convertible Clutch for single stroke or continuous operation.

★ *Send Quickmail Coupon No. 43 today for literature and prices. The Marshalltown Line includes Inclinable Presses to capacity of 70 tons.*

MARSHALLTOWN MFG. CO.

900 East Nevada St.,

Marshalltown, Iowa

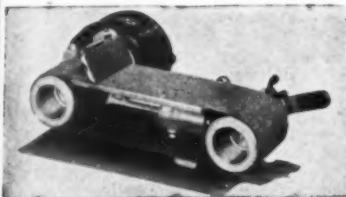
CARROLL Universal Dividing Heads

20 Years of Popularity. 6", 10 1/2",
12" Swing. Right or Left Hand
Type.



WM. CARROLL & SON
1776 Lexington Ave.. (Norwood) Cincinnati, Ohio

HORMEL-M GRINDER



An Inexpensive

ABRASIVE BAND GRINDER

"Built Like A Machine Tool"

The Hormel-M Grinder is sturdily built with a supporting leg under the grinding table to eliminate vibration and tipping due to pressure on belt. Ball bearing throughout, equipped with Alemite lubrication, complete with grease gun.

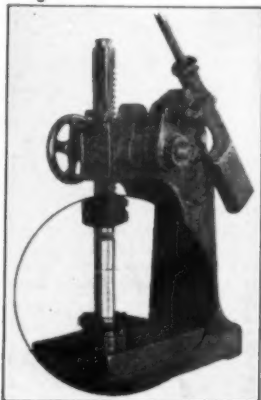
Write for illustrated folder on this and other styles and sizes.

WALLS SALES CORP.

96 Warren St., New York, N. Y.

Glenny Adjustable- Expansion Broach

The East Shore Machine Products Co., 833 East 140th St., Cleveland, O., offer an adjustable broach for simplifying the cutting of keyways. Adapted for use in an arbor press, with mechanical or hydraulic pressure, these broaches were developed to produce low cost, accurate keyways in parts such as gears, cutters, bushings, etc.



It is pointed out that the sturdy and simple construction enables the average mechanic to handle the broach with ease. Cutter bars are designed to permit numerous regrinds before replacements are necessary. These replacements require very little time and can be made by the operator.



Write on your
letterhead for
free shop sample.

● USE LAYOUT FLUID ●

for general machine shop and tool room use
on dies, jigs, fixtures and machined parts.

With the use of die blue layout fluid you do not have to polish the surface of the work. Simply wipe surface fairly clean and brush on. **DRIES INSTANTLY.**

5 oz. 40¢—1 qt. 90¢—1 gal. \$2.50

DAYTON ROGERS MANUFACTURING CO.
MINNEAPOLIS MINN.

Cutter bars are made in carbon and high speed steel, and can be supplied for extra depth keyways.

Set No. 10 includes the most popular sizes of broaches— $\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$, $\frac{7}{8}$ and 1-in., packed in a wooden box with individual compartments.

Straight Side Light-Weight Stacking Box

Combining a one-piece welded stacking rim with straight sides, a new stacking box developed by Stackbin Corp. offers strength, rigidity and freedom from torn corners.



The stacking rim rests upon and is welded to the sides of the box, eliminating a weakness found when the sides are bent to support the rim. Consequently, the sides can be made of lighter gauge steel, and the price materially lowered, without any sacrifice in strength.

The rim is of 14 gauge steel, double thickness, formed in one piece, and welded to make a solid rim which resists corner bending even under heavy loads and rough handling.

This type of construction, it is claimed, adds to the durability of the box, and permanently ends sharp, broken corners which can cause serious cuts on ankles and hands. The safety feature is carried out in the perfectly clean, smooth exteriors and interiors.

A patent application has been made by Stackbin Corp., 48 Troy St., Providence, R. I., who are offering the new style boxes in any wanted size at unusually low prices.

ASK FOR THE GENUINE

COMET Vernier Caliper

\$5.50

with genuine leather pocket case.

WHY PAY MORE?

Send for one today!

Shop agents, dealers wanted.

Measures to .001" Outside, Inside and Depth

Measuring range 5-5/16"

Total length 8"

Scales: 1/16" with vernier 1/128"

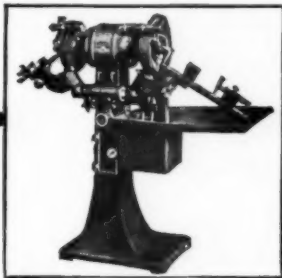
.025" with vernier 1/1000"

Decimal equivalents on reverse side of gage.

Glass-hard jaws.

Fine workmanship.
A precision tool at a reasonable price.

COMET TOOLS, Inc.
39 Union Square, New York, N.Y.



USE THIS

GRAND RAPIDS DRILL GRINDER

AND YOUR DRILLS WILL CUT FASTER
STAY SHARP LONGER
PRODUCE MORE AND BETTER WORK
BULLETIN ON REQUEST

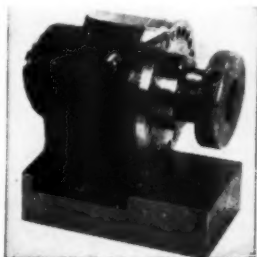
GALLMEYER & LIVINGSTON CO.
405 Straight Ave., S. W.
GRAND RAPIDS, MICHIGAN

Tree Collet Index Fixture

The Tree Index Fixture is not intended to take the place of a large dividing head. Owing to its small size and ease of set-up it should be very useful in milling square and odd shaped punches, milling teeth in shank cutters, small pinions, also in milling multiple flats, slots, keyways and notches of all kinds. Anything that can be held in collets on a lathe for turning, may be held in this fixture for milling, drilling,

grinding, laying out or checking.

The fixture takes collets up to $\frac{3}{8}$ -in., and has an index plate with 24 holes, which gives 2, 3, 4, 6, 8, 12 and 24 divisions. It has a hardened and ground tapered spindle and cast iron

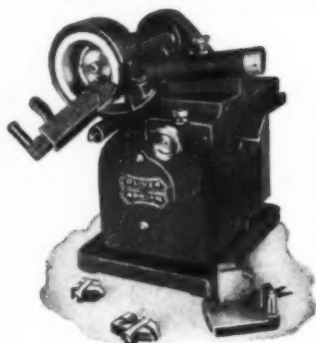


base. There is a hardened thrust washer back of the shoulder on front end of spindle, for take-up by grinding thrust washer. Secured to the back end of spindle is an index plate with

NOPAK AIR VALVES

3 and 4 Way

GALLAND-HENNING MFG. CO.
2753 S. 31st St., Milwaukee, Wis.



Cut illustrates No. 21 Bench model drill grinder for small drills.

OLIVER OF ADRIAN

Drill Grinders

Cutter Grinders

Face Mill Grinders

Die Making Machines

Tap Grinders

Tool Grinders

Point Thinners

will reduce your tool and cutter costs—grinding time, etc., BECAUSE tools, drills, and cutters ground the Oliver way last longer, they cut better, they produce more accurate work.

Oliver grinders will place your plant on a higher plane of efficiency. Send for literature.

OLIVER INSTRUMENT CO.

1408 E. Maumee Street

Adrian, Michigan

24- $\frac{1}{4}$ in., reamed holes accurately spaced. Locking pin working in this plate is hardened and ground, and is operated by a rack and pinion. Bottom and sides of base are accurately ground parallel with the spindle.

Spindles are available to take several of the more popular sizes, enabling use of the collets on hand. Larger work can be mounted on an arbor and held in the collet to drill evenly spaced holes in flanges, or the bushing holes in a small drill jig can be drilled and reamed without a layout.

The fixture can be held in a milling machine vise or it can be bolted directly to the table. It can be placed on the magnetic chuck of a surface grinder and square, hexagon and other shapes of punches can be ground to size after hardening, without previous milling. The fixture can also be used for sharpening fish tail, woodruff and other types of cutters.

For further information, address the Tree Tool & Die Works, Racine, Wis., and kindly mention The BLUE BOOK.



Tapping As Fast As You Can Drill ..

with the A. M. Sensitive Tapping Machine ... from the smallest and finest up to $\frac{3}{16}$ " diameter in steel and iron—and up to $\frac{1}{4}$ " in softer materials. A modern unit that within its capacity, will take all the punishment intense production can inflict.



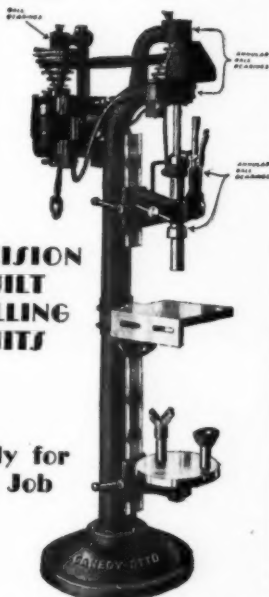
Write TODAY for this sure solution of your small tapping problems.

A. MUEHLMATT DIVISION

OF

THE HAMILTON TOOL CO.
HAMILTON, OHIO

CANEDY-OTTO



PRECISION BUILT DRILLING UNITS

**Ready for
the Job**

Featuring the 6-speed C-O No. 3000 F-V Sliding Feed Sensitive Floor Drill, this sturdy, dependable unit is accurate and flexible over a wide range of drilling operations.

Full ball bearing spindle—self-aligning ball bearing on motor bracket—sliding motor mounting for belt adjustment—double hinged bracket for quick speed changes—these are some of the attractive features.

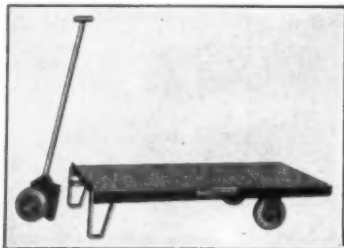
The C-O Line comprises a full range of precision drilling units, single and multiple spindle. The C-O-Matic Power Feed is also available. Complete stocks at New York and San Francisco Branches.

Send for bulletins giving full information.

CANEDY-OTTO MFG. CO.
CHICAGO HEIGHTS, ILL.

Lewis-Shepard Jackmaster System

A new low cost method of handling materials is offered by Lewis-Shepard Sales Corp., 215 Walnut St., Boston,



Mass. The system is based on an ingenious detachable front dual wheel truck, which slips under and lifts the load by means of the lever handle.

Three standard skid sizes are offered—30x60, 36x60 and 36x72-inches, with load capacities of from 2500 to 3500-

T. H. L. FRONT LEVER BENCH PUNCH

Built for hard, tough work — die can-

PRICE WITH ONE
PUNCH AND ONE
DIE—

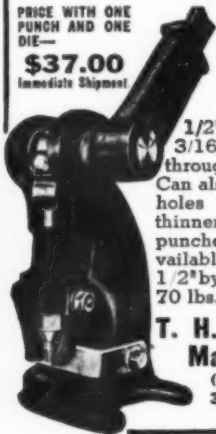
\$37.00
Immediate Shipment

not lose alignment with punch — all parts interchangeable.

Capacity —
1/2" holes through
3/16" steel; 13/32"
through 1/4" steel.
Can also be made for
holes up to 7/8" in
thinner metal. Stock
punches and dies a-
vailable from 1/16 to
1 1/2" by 64ths. Weight,
70 lbs.

**T. H. Lewthwaite
Machine Co.**

(Est. 1890)
311 E. 47th St.,
NEW YORK



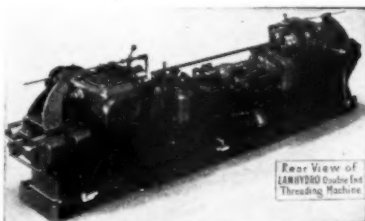
lbs. Frames are of arc welded steel and the flush hardwood tops are held in a vise-like grip by the double side girders.

For complete details please address the makers, mentioning The BLUE BOOK.

Lanhydro Double End Threading Machine

The Landis Machine Co., Waynesboro, Penna., have added a new unit to their extensive line of equipment.

It will cut threads simultaneously on both ends of tie rods, short bars, etc., and opens an entirely new field for handling work of this type on a production basis.



Rear View of
LANHYDRO Double End
Threading Machine

In operation the machine passes through the following cycle: Operator places work to be threaded on the work supports, positioning it in the open gripper jaws by bringing end of work in contact with work stop. He then actuates the main control valves by a hand lever, closing the gripper jaws. The work stop then raises to clear threading unit, and both threading units advance rapidly to a predetermined point at which the chasers are just clear of ends of work. Then threading units drop into a threading feed which continues for duration of threading operation. Opening of threading heads is controlled by yokes and trip rods on each threading unit. Upon completion of thread, opening action of die head shifts a valve which causes the threading units to return at high speed to their original or "rest" position.

Return movement of the threading

units closes die heads automatically and operates valve which opens gripper jaws. Work ejector cylinder is actuated by the opening of gripper jaws and following this movement the work stop is lowered. The entire hydraulic system is so interlocked that no movement can take place before each preceding movement in the cycle is completed.

Several movements of hydraulic system are controllable through separate valves to permit increasing or decreasing

the functioning speed. For example, the speed at which the threading units advance to the work can be raised or lowered by the simple adjustment of a valve, and the speed at which the ejector removes the work from the gripper jaws is also variable in a like manner. These adjustments are provided in order to insure the minimum idle time for various diameters which the machine will handle.

In writing for further details, please use Coupon No. 52.

SCHMIDT "Hi-Duty" Pneumatic MARKING MACHINE



MODEL 25
(Side view shows
air cylinder)

ADVANCED BUSINESS METHODS demand improved records of metal fabrications. This machine makes marking operations quick and simple. Part numbers—order numbers—manufacturer's name and other important data marked on your products will mean permanent records, to last the life of the part, and REPEAT ORDERS, a vital part of any business.

The Schmidt Model 25, illustrated at left, is a light, general purpose hand marking machine, with a supplementary air cylinder to take the place of the foot pedal in raising the work to the lettering tool. Air from the shop line is used, and the four-way foot valve assures fast operation. This machine uses solid flat or round dies as well as the adjustable type, in a flat or knurl type holder. The use of the air cylinder, by reducing operator fatigue, greatly increases production on continuous marking operations.

SPECIFICATIONS

Will mark flats or irregular surfaces up to 4" thick.	
Will mark rounds up to 10" diameter, or bars up to 4" diameter.	
Carriage or Die Stroke	2 1/2"
Throat—Center of die to front of uprights	3"
Roller Bearing Die Slide	
Table Rise—Low to High Position	6"
Table Rise by Air Cylinder	3/4" - 1"
Table Pressure 2400 lb. at 75 lb. line pressure.	
Table Dimensions 5 1/2" x 9 1/2" with 2" x 4" slot.	
Operates on line pressure of 30 lb. to 100 lb.	

Send Quickmail Coupon No. 40 for complete catalog of our full line of Marking Tools, Machinery and Equipment.

GEO. T. SCHMIDT, Inc.

1802 Belle Plaine Ave., Chicago, Ill.
Builders of Marking Equipment Since 1895.

"Bliss" 4L-71½-84-Inch Four-Point Single- Action Press

Designed for the automotive trade, this lever type press, has opposed motion rockshafts. These, running from front to back impart an opposed motion to the levers by means of eccentrics. This motion draws the slide up and then pushes it down for the working portion of the stroke. As a result,

thrusts are equally distributed over the gibs under all loading conditions. Further, it prevents tilting of the slide while subject to unbalanced loads.

Grinding
Lapping
Polishing
Finishing
Small
Parts.



DO IT
BETTER,
CHEAPER,
QUICKER,

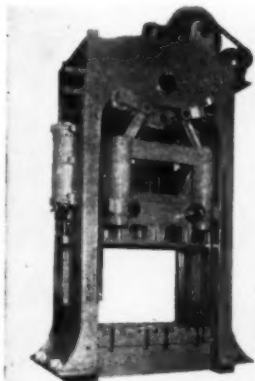
WITH A SCHAUER
SPEED LATHE—

The tool you've been hunting to cut costs. Avoid tying-up your larger equipment with small jobs. Hand, foot or air-operated 3-jaw chucks. Hand or foot-operated collet, sizes ⅛ to 1¼-in.—¼, ½ or 1-h. p. AC or DC 2-speed motor. Steel bed plate or bench mounting.

Send today for circular 351

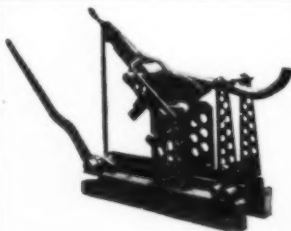
Schauer Machine Co.

2064 Reading Road, Cincinnati, O.



This press was developed by the E. W. Bliss Co., Toledo, Ohio, for blanking and shallow forming work. The main outer links straddle the outer web of the crown, eliminating any bending of the shaft and transmitting the load as a direct thrust through the web. This makes the press exceedingly sturdy and resistant to deflection.

Due to the linkage, a slight dwell at bottom stroke is obtained, which is very desirable in connection with drawing work. The dwell allows the metal to "set" when the punch is at the bottom of the die.



PEDRICK UNIVERSAL BENDING UNIT

Set this simple, portable machine down anywhere in the field and it's ready for all kinds of bending operations on pipe, flat stock, bars, etc. Easy adjustments provide for a wide range of jobs, quickly performed with the powerful ratchet lever combination.

Write TODAY for full information.

PEDRICK TOOL AND MACHINE COMPANY
3640 N. Lawrence St., Philadelphia, Pa.

The press has a capacity of 250-tons at bottom stroke. All the gearing is inside the crown, resulting in straight, clean-cut lines. Electrically controlled by push buttons for inching and running, the press operates at a speed of 15-strokes per minute. The clutch is of the latest improved multiple disc pneumatic type, incorporating both clutch and brake in one unit. Drive is by V-belts.

Stroke is 16-inches with 20-inch adjustment of the slide by a reversible electric motor; 48-inch diespace, stroke down, adjustment up, and the bed area is 50-inches front to back by 84-inches right to left. The extremely long adjustment permits use of high or low dies at will.

Incorporated in the bed is a self-contained, externally guided "Marquette" pneumatic cushion which will give 22.6-tons blankholding pressure from air line pressure of 100-lbs., per square inch. Bed of the press is partially concealed in the pit. The counterbalance cylinders, which compensate for weight of the slide, are mounted in the uprights.

Quietness of operation and accessibility of all wearing parts are distinctive and desirable advantages.

Washer Firm Publishes New Stock List

The Wrought Washer Mfg. Co., Milwaukee, Wis., producers of washers, expansion plugs, stampings, tools and dies, announces publication of a new stock list — No. 55-B — available to manufacturers upon request.

This new publication lists thousands of washer specifications in various materials, including steel, brass, copper, aluminum, fibre, etc., carried in actual inventory available for immediate shipment. The sizes permanently maintained in stock are so designated, thus enabling manufacturers to select for standard production as well as new assemblies the particular sizes on which they can always obtain prompt delivery.

FAST! SAFE, ACCURATE AND AUTOMATIC—



**WITTEK
ROLL
FEEDS**

You can speed-up operations with greater safety and accuracy with **WITTEK AUTOMATIC ROLL FEEDS**. Keep presses operating up to capacity—feeding any stock from coils in lengths up to 24" per press stroke—saving in time and dies and cutting production costs. Single Roll, Double Roll and Compound Types with Straightener — for every size and make of punch press without alterations.



WITTEK Reel Stands — 6 models — enable one man to center heavy coils. Ball bearing mounted—adjustable to any height—balanced at any angle—500-lbs. capacity.

Send for Bulletin "HF" giving complete details.

A size for every requirement.

WITTEK MANUFACTURING CO.
4305-9 W. 24th Place, Chicago, Ill.

Stearns Improves Magnetic Pulley

The Stearns Magnetic Mfg. Co., formerly Magnetic Mfg. Co., Milwaukee, Wis., announces some outstanding improvements in its high duty magnetic pulley.

All of the original outstanding features of the magnetic pulley have been preserved, including the one piece casting. To allow for greater radiation area, a new ribbed construction was designed, including deeper coil pockets for more ampere turns and greater magnetic strength.

The system of air ducts has also been improved. The coil windings are said to be more efficient due to improved cooling by the forced air circulation and by the compressive action of the belt which forces the cooled air into the ribbed interior of the pulley on the upper side and expels the heated air by the suction of the belt on the lower side.

The windings, completely surrounded by steel, are fully protected against external hazards. The steel cover plates enclosing the outer diameter, while light in weight and cross section (approximately 5% of the pole area)



are of ample strength to carry the belt, with the added advantage of uniform flux distribution by short circuiting a small amount of the magnetic lines of force. This provides a comparatively uniform magnetic field over the entire width of the belt.

The non-magnetic end rings of special alloy steel extend beyond the

ACE SPOT WELDERS

**For Economically Fastening or Joining
Assemblies of Sheet Metal or Wire**

*Cheaper, Faster and Better
than riveting*

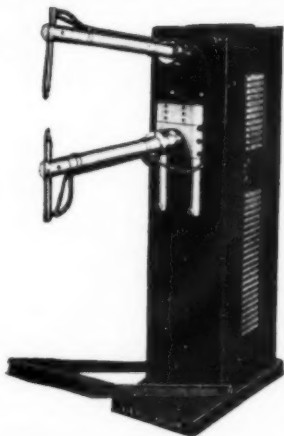
Modern design, based on simplicity, use of welded steel in place of heavy castings and incorporation of latest developments in resistance welding characterizes these ACE SPOT WELDERS. These factors provide easy, speedy operation, low first cost, low operating cost and dependability. Made in sizes from 5 KW up.

ONLY for Series 62 Welder 5 KW
\$90 Welding capacity
2 Pcs 16 Ga. Steel

Send for detailed literature and prices today

PIER EQUIPMENT MFG. CO.

WELDING EQUIPMENT DIVISION
638 Cross St., Benton Harbor, Mich.



active face of the pole and are machine fitted to the end poles. These provide a support for the unloaded edges of the belt at either side and confine the magnetic force of the pulley to the active portion.

The one piece magnet body is held firmly in fixed position on the steel shafts by extra heavy steel hubs, welded to the supporting arms and keyed in position abutting the shoulder of the oversize portion of the shaft, providing a rigid and substantial construction.

Due provision has been made for weather-proofing. Special gland type fittings seal the lead-in wires against moisture. Voids under the coil covers are filled with high temperature melting compound.

Stearns magnetic pulleys are furnished in a wide range of diameters and face widths.

Address the makers for further details, and please mention The BLUE BOOK.

Air-O-cheke
TRADE MARK

The Modern Air Gun

For blowing and cleaning purposes in machine shop, foundry and factory.

A NEW MECHANICALLY-PERFECTED PRINCIPLE in AIR GUNS . . . Operating mechanism shielded within valve body and air hose . . . Streamlined with hose . . . Superconvenient to operate . . . Leakproof by virtue of no packing glands . . . Stocked in six standard sizes . . . Used by leading Industrials.



Write for Full Details

AIR-WAY PUMP & EQUIPMENT CO.
623 W. Jackson Blvd. Chicago, Ill.

WHY . . .

has Severance retained all employees during the recent business slump? And added more than twice as many new customers in the first half of 1938 as in the like period of 1937 when business in general was better?

How can Severance ship 98% of new orders on approval?

Why do over 90% of trial orders bring repeat orders?

What prompts customers to write, "We were much surprised and pleased at the results obtained . . . it will cut our tool cost at least three quarters"?



GET THIS NEW CATALOGUE

It will tell you of the revolutionizing design of Severance cutters.

It will tell you of tremendous improvements in Auto Body plants made possible by Severance Cutters.

It will tell you how Diesel Manufacturing has been stepped up with Severance Cutters. It will be your constant reference book as new jobs develop and new problems confront you. Every tool designer and production engineer will want this suggestive handy size booklet.

Over 80 UNUSUAL CUTTERS are pictured and described; they may suggest the solution to some tool problems that have baffled you.

It will pay you to investigate. — No Obligation. — Just write today for your copy of the new Severance Special Tool Catalogue No. 12.

SEVERANCE TOOL MFG. CO.
1510 E. Genesee Ave.
SAGINAW, MICH.

*"First Aid" Kits of***WALTON
TAP
EXTRACTORS****ARE A SHOP NECESSITY
WHEREVER TAPS
ARE USED**

They remove
taps broken at or be-
low the surface of the
hole easily, quickly
and without injury
to the threads.

Send for Folder 132
giving sizes, styles
and prices.

Test their worth by
30-day Free Trial.

The Walton Co.
95 ALLYN STREET
HARTFORD, CONN.

**Beatty Hydraulic Press
Brake and Flanging
Machine**

Flanging, V-bending, forming, pressing and straightening are some of the jobs within the range of this new machine for plate work offered by the Beatty Machine & Mfg. Co., 954 150th St., Hammond, Ind.



A 300-ton hydraulic press brake and a $\frac{3}{4}$ -inch flanger are now available in one unit, making it possible to bend, press, straighten and reclaim steel sheets, and to handle all types of flanging in connection with locomotive boiler and firebox work at one point. The machine applies equally as well to all lines of plate forming where V-bending, pressing, straightening and other plate parts are used. No time is lost making adjustments for materials of various thicknesses.

An 8-page 2-color bulletin presents complete information on this big, versatile machine, with several illustrations of operations being performed on it.

Standard Tips and Tools

A new 12-page bulletin of the Tungsten Carbide Tool Co., 7171 E. McNichols Road, Detroit, Mich., presents many standard forms and sizes of Firthite, Vascalay-Ramet and Carboloy tips and tools. Tables of style numbers, dimensions and prices are given. Copies of the bulletin will be mailed on request, and in writing, please mention The BLUE BOOK.

CLEVELAND'S**Newest HOTEL
STERLING**

Providing every comfort and luxury at low cost. An exclusive hotel home, ideally located in the center of things. Large beautiful rooms with private bath . . . Genuine hospitality . . . Free parking for guests.

**SPACIOUS ROOM
WITH BATH**

\$2.

Low Monthly Rentals

**HOTEL
STERLING**

R. M. BARNETTE,
Manager

PROSPECT at E. 30th

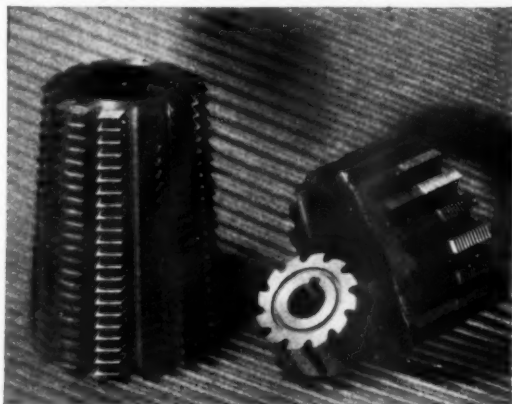


*Send for bulletin
and price list*

*Use Quickmail
Coupon No. 63*

THREADS

Detroit Tap's thread milling cutters are finished to the most rigid API or National Standards—by form grinding—for utmost in work accuracy and longest life.



Also: TAPS—ground form threads checked with finest inspection equipment. THREAD GAGES—produced under controlled temperature and humidity. THREAD ROLLING DIES providing lower threading costs through specially selected Detro steels. Fastest deliveries on special tools.

There is a representative in your territory.

8432 Butler DETROIT TAP & TOOL COMPANY Detroit



TANNEWITZ
24" Hi-Speed Band Saw
SAWS NEARLY EVERYTHING

Including Wood, Sheet Steel, Brass
 and Aluminum Casting Gages, etc.

1½ H. P. Direct Motor Drive.
 Also 30"-36"-42" Sizes.

**TANNEWITZ WORKS, GRAND RAPIDS,
 MICHIGAN**

Scribed Lines
"STAND OUT"
When You Use
SUPREME
LAY-OUT
DYE



They're easy to see—easy to follow
 because they have a pronounced contrast
 against the dark background.

With SUPREME Lay-Out Dye it isn't
 necessary to "polish—simply clean the
 surface and apply the Dye with a soft
 cloth or brush. It dries instantly. Excel-
 lent for wet machining operations.

Special Offer—

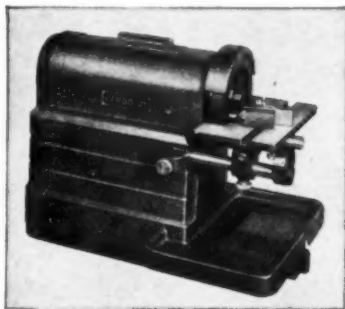
Send 40 cents for a 5-ounce combination
 brush-in-can container for shop use.

Quart containers .90 Gallon containers 2.50

MICHIGAN CHROME COMPANY
 6340 E. Jefferson Ave., Detroit, Mich.

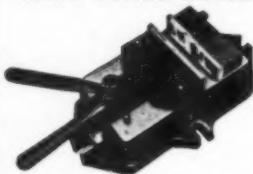
Carboloy Company
Announces Inexpensive
Tool Grinder

An inexpensive bench type tool
 grinder for the safe, rapid, and eco-
 nomical sharpening of cemented car-
 bide tools in sizes up to 1-in., square
 or equal cross section, on diamond
 wheels and lapping discs, is announced
 by Carboloy. This grinder is said to
 provide all the features necessary to
 duplicate the performance of new tools
 at every sharpening.



The machine has a quick setting
 graduated dial, with large gradua-
 tions, permitting accurate angular ad-
 justment of the table to maintain cor-
 rect rake and clearance angles with
 keen cutting edges and smooth tool
 faces. Wet grinding with diamond
 impregnated wheels, as performed on
 this machine, permits faster, more ac-
 curate sharpening, resulting in excep-

HARD USAGE Doesn't Phase The HARTFORD MILLING VISE



Because it was designed to "take it"—and it does! It will stand up, day
 after day, under the heaviest, toughest strain of production milling work.
 Made of the best materials, with all parts interchangeable, it will outlast
 four or five ordinary vises. Rapid and accurate in operation—the top
 eccentric handle gives tremendous binding force, while the lower cam-
 faced handle gives instantaneous quick-opening and return. A trial in
 your shop will convince you better than anything we might say.

Write for Folder and Complete Details

Jaw width 5" Maximum opening 3½"
 Jaw depth 1¼" Weight 40 lbs.

Also made in the swivel-jaw type with hard
 or soft jaws, maximum opening 2¼".

HARTFORD SPECIAL MCHY. CO.
 285 HOMESTEAD AVE., HARTFORD, CONN.

We also Build Machinery on a Contract Basis,
 Design and Develop Special Automatic Ma-
 chinery—Gears and Combs Cut to Order.

tionally long tool life. Tool rest table is mounted across face of wheel with a slot provided for a tool guide protractor, making it possible to grind angles on the tool without checking by hand protractor. The distance from wheel to tool rest is adjustable. Forward and reverse rotation of the wheel, facilitating the grinding of right and left hand tools, is controlled by a switch at the front of machine under the drip pan. The 1½-in., heavy duty spindle runs on selected commercial ball bearings. Double row bearing with labyrinth seal at wheel end and single row plate-sealed at pulley end, assure long life with minimum end play in spindle.

The driving mechanism is accessible for easy oiling and for quick belt adjustment by lifting off the rear guard. Coolant reservoir is built into top of machine and is connected to coolant applicator by a needle valve control. Standard 6-inch plain cup or straight diamond wheels or special cup diamond wheels coated on face and peri-

phery can be used on the grinder. Cast iron lapping discs can also be used.

Overall dimensions are: — 14¾-in., high, 13½-in., wide and 20¾-in., deep. Uncrated weight is 135 lbs. Standard electrical equipment includes ¼ h.p. reversible motor, for 110 volt, 60 cycle, single phase operation at 1725 r.p.m., and reversing switch.

Descriptive leaflet may be obtained from Carboloy Co., Inc., 2985 East Jefferson Ave., Detroit, Mich. In writing please mention **The BLUE BOOK**.

SOUTH BEND Precision LATHES

Back-Geared. Screw Cutting. Metal Working

**9", 11", 13", 15" AND 16" SWING
3' TO 12' BED LENGTHS**

PRICED \$85 TO \$1500

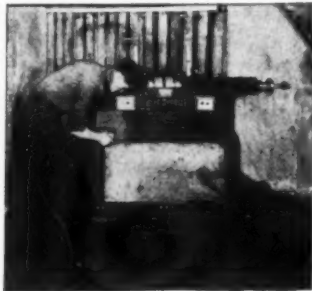
WRITE FOR CATALOG

SOUTH BEND LATHE WORKS

679 E. Madison St.,

South Bend, Ind., U. S. A.

HERE'S HOW LEADING MACHINE TOOL MANUFACTURERS SAVE 50% TO 75% WITH THE



Sterling Speed-Bloc Sander

"We are using the Sterling Sander for sanding our machine bases and castings after they have been filled. We save 60% on labor and get a more uniform finish."

"We have found that the one sander does the work which formerly required three or four men."

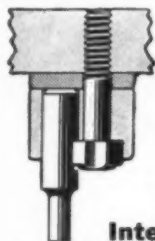
"We are using the Sterling Sander in smoothing up filler on cast iron parts of machine tools to get a good smooth surface and find this sander does better work than any sander we have ever tried."

*Investigate this modern, proved device.
Send today for literature.*

STERLING PRODUCTS COMPANY

363H DONOVAN BUILDING,

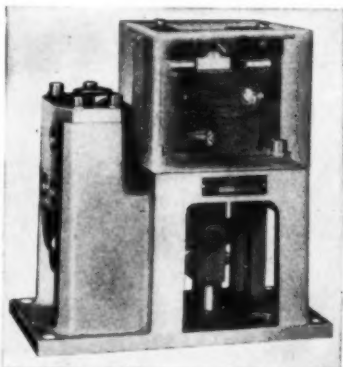
DETROIT, MICHIGAN

ARMGLO CO.*Manufacturers of***Manual and Automatic Resistance
WELDING PRODUCTION EQUIPMENT**
with Magnetic Timing Control
*also***DIE FILING & BELT SURFACING MACHINES***Write for complete details***ARMGLO CO.,** 3520 W. Pierce Street,
MILWAUKEE, WIS.**HOVIS
Hardened
Retainers****Strongest
Simplest
Interchangeable
Punch Retainers Made.****EASILY** Locked in
—Removed**NO** Gadgets
SpringsGroup plates of any size or number
of punches, to your requirements.

Catalog on request.

HOVIS SCREWLOCK CO.**3125 E. Larned St., Detroit, Mich.****Two New High-Speed Air
Control Valves**

Two new Ross solenoid controlled air valves are announced. Both are especially designed for high speed service such as required for numerous welding operations. One is for the control of single acting and the other for double acting cylinders.

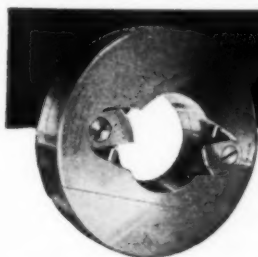
The poppet principle employed in their standard line is retained in both models—compactly designed and light in weight to meet this particular type of service. Made in $\frac{3}{8}$ " pipe size. Available in all standard current characteristics.

The manufacturer claims that the utilization of air line pressure for reversing the valve action is an unusual feature; elimination of return springs

**BROACH and ASSEMBLE****SELF-CONTAINED 4 TON GREENERD HYDRAULIC ARBOR PRESS No. H-56-D**Adaptable for assembling, broaching, burnishing, etc. Speed of ram down, 247 inches P. M.; daylight, 16 inches; adjustable ram stroke from $\frac{1}{2}$ to 16 inches. Complete with 5 HP motor and starter for 220-440-550 volt, 50 or 60 cycle, \$675.00 F. O. B. Nashua. Write for Bulletin No. 102.We also make 65 styles of Rack and Pinion Presses, as well as Hydraulic Presses from $\frac{1}{2}$ to 15 tons capacity.**GREENERD ARBOR PRESS CO., INC.**

43 Crown Street

Nashua, N. H.



for
your
lathes

SENECA FALLS *Automatic* WORK DRIVER

Self Centering... Quick Acting... No Slip. Attaches to any chuck plate or spindle. Provides a slip-proof, balanced drive reducing chatter. Handles rough forgings or turned pieces—straight or taper. Eliminates dogging time. Reduces tool breakage. Write for details and size range.

SENECA FALLS MACHINE CO., 314 Falls St., Seneca Falls, N. Y.



with
Breuer's Ball Bearing
TORNADO
PORTABLE INDUSTRIAL VACUUM CLEANER

**THE MOST POWERFUL VACUUM CLEANER
FOR ITS SIZE EVER BUILT!**

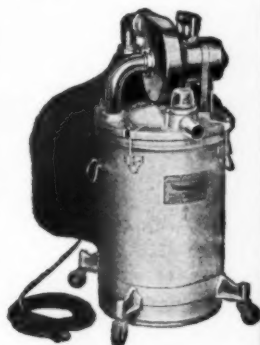
**46 1/4" Waterlift! 1 H. P. G. E. Ball
Bearing Motor—Weights Only 40 lbs.**

The TORNADO is an extremely portable Vacuum Cleaner that has gigantic power built into small space. It will pick up everything, including water. Gets into places ordinary cleaning methods never reach. Cleans walls, floors, piping, shafting, machinery, stock bins, boiler tubes, motors, etc. Proper tools for each plant application available.

Eliminates the expense of stationary plants or semi-portable cleaners—does everything that big machines do, at a fraction of the cost.

The TORNADO will pay for itself in any one department, **but** you use it throughout the plant—from boiler room to penthouse.

Send Quickmail Coupon No. 30 for literature which gives money-saving facts on cleaning and maintenance that you will be glad to know. No obligation.



BREUER ELECTRIC MFG. CO.
5108 N. RAVENSWOOD AVE., CHICAGO



BAUMBACH

STANDARDIZED

DIE SETS

Machined Steel Semi-Steel

Drop Forged Steel

Headquarters for Standardized Die Sets, embodying many exclusive features and embracing more than 185,000 stock sizes and 46 different styles. A die service that is unsurpassed. Let us prove it!

Write for our new 288 Page Catalog.

E. A. BAUMBACH MFG. CO.
1810 So. Kilbourne Ave., CHICAGO, ILL.

— GEARS —

**Spur—Helical—Worm—
Bevel—Miter, Etc.**

We do broaching and all kinds of grinding.

We specialize in grinding hardened steel bushings, cam rollers, etc.

Prompt service and quality has retained a large list of customers for 25 years.

TAYLOR MACHINE CO.
1919 E. 61st St., Cleveland, Ohio

permits the use of smaller solenoids.

Simple, sturdy construction throughout, with easy access to all working parts, adapts these valves to production operations where extreme serviceability together with rapid interchanging of parts is of major importance. Valve proper or solenoid is removable by loosening four bolts.

For further information address the Ross Operating Valve Co., 6480 Epworth Blvd., Detroit, Mich.

High Speed - Light Weight Portable Grinders

The Black & Decker Mfg. Co., Towson, Md., announces two completely new high speed portable grinders with



wheel size capacities of 2 and 2½-inches. These are precision tools, having a no-load speed of 19,000 r.p.m.; an overall length of 13½-inches and the very light weight of 3½ and 4½ pounds, respectively.

Having been designed for use where a small size wheel is required, they are quite versatile in their general application. Being nicely balanced, they are particularly easy to handle where accuracy and fine grinding are necessary. Address the makers for further details, and please mention The BLUE BOOK.

Another Catalog by Holo-Krome

The Holo-Krome Screw Corp., of Hartford, Conn., manufacturers of Holo-Krome Fibro Forged socket screws, have issued a new pocket size (5x6½) catalog containing 40 pages of data, tables, standards and applications of value to users of socket head cap screws, hollow set screws, socket head stripper bolts and hollow pipe plugs.

Signal Portable Drills

An increased demand for its line of portable electric drills is reported by Signal Electric Manufacturing Company, Menominee, Mich. At the present time three models are offered—a light duty $\frac{1}{4}$ ", a standard duty $\frac{1}{4}$ " and



a standard duty $\frac{1}{2}$ ". Illustrated here in use is the OB-4, standard duty $\frac{1}{4}$ " drill. Plans for enlarging its line of drills are being considered.

Rubber Cushioning Machinery

Rubber mountings for machinery, called "vibro-insulators" may eliminate up to 90% of the vibration in machinery and help to extend the life of concrete structures in which the machines are housed, as well as relieving nervous strain on the workers. Such mountings have been developed by the B. F. Goodrich Co., Akron, Ohio, who point out that rubber of the proper composition may be subjected to extensive distortion without creeping or setting excessively. Some of the rubber compounds may be stretched 1000% before reaching the breaking point. New methods of bonding the rubber to metal have made the rubber mountings for heavy machinery possible.



ONLY WIREGRIP BELT HOOKS

have the blue aligning cards that prevent hook waste—loss from handling, loss of short card ends.

ARMSTRONG-BRAY offers the only complete line with both types of belt lacing—WIREGRIP Belt Hooks and STEELGRIP Flexible Belt Lacing (that goes on with a hammer); also Lacers both vise and bench types, and couplings and fasteners for round belting.

Those Who Use Belt Hooks prefer WIREGRIP HOOKS, because they are safely handled, and because the aligning card holds hooks, even the shortest ends, in perfect alignment.

Write for catalog sheets

Armstrong-Bray & Co.

"The Belt Lacing People"

315 N. Loomis St., Chicago, U.S.A.

SPEED REDUCERS

SPUR AND WORM TYPES

Lighter per horse power. Ball or roller bearings. Gears and shafts assembled in rigid, enclosed, dust-proof housings. Many sizes and capacities in stock.

Write for new catalog.



GEARS

Any type, quantity, material. Prompt deliveries—as specified.



Abart GEAR AND MACHINE CO.
MANUFACTURERS OF
Speed Reducers & Gears
4422 W. 117th St. CHICAGO, ILLINOIS

Royal Chrome Industrial Furniture

Many different styles and types of stools and chairs, designed for practically every kind of operation in all types of factories are shown in the new catalog of the Royal Metal Mfg. Co., 1138 So. Michigan Ave., Chicago. Further, the catalog gives interesting and practical information on correct seating and posture for workers in industry. Furniture for offices, reception

and rest rooms is also shown. Copies of the catalog will be mailed on request, if you kindly mention The BLUE BOOK.

New Dynaprecipitor Unit Announced By Binks

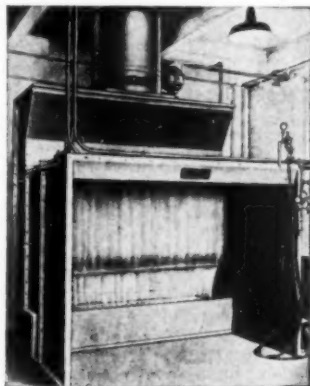
The Dynaprecipitor, a radically new development replacing ordinary water-wash chambers for spray booths, is announced by the Binks Mfg. Co., 3114 Carroll Ave., Chicago, Ill.



Equip your presses for deep drawing work for as low as \$75, complete.

Write for our engineering booklet on deep drawing die work.

Dayton Rogers Manufacturing Co.
Minneapolis, Minn.



Using an entirely new principle in the cleaning of paint fumes, the DYNAPRECIPITOR reclaims all types of paints, synthetic enamel, vitreous enamel, etc. It has no nozzles to clog or wear out, is said to give more efficient elimination of paint pigments from spray fumes (99% efficiency) and is economical to operate.

The unit is equipped with a special set of self cleaning precipitator plates. Another feature is the water curtain which extends the full width of the spray booth. The paint pigments which strike this are washed down into the collecting pan, thereby eliminating the necessity of cleaning the front surface.

Complete details or quotations on this new unit will be sent to interested parties on request. In writing please mention The BLUE BOOK.

HOTEL AUDITORIUM

A splendid hotel in an ideal location — with superior service, genuine hospitality and three restaurants featuring excellent cuisine . . . Visit the Alpine Tavern, the rendezvous of Cleveland.

300 ROOMS

with Tub and Shower

\$2, \$2.50 and \$3.00

H. F. MOORE, Manager

E. Sixth St., and St. Clair Ave.
Opposite New Civic Auditorium

Newest in Downtown
CLEVELAND

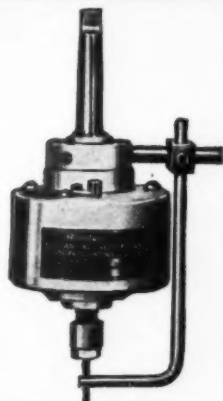
ERRINGTON HYSPO

**Super-Sensitive Ball Bearing CONE DRIVE
2 to 1 Auto.Reverse Tapping Chuck**

- Combination Bronze and Ball Bearings Throughout.
- Easy and Economical Replacement of Cone-Clutches.
- Depth gauge facilitates Quick Handling especially on Bottom-Holes.
- Other Styles and Sizes 0" to 2" taps.

Size	Taps in Steel	Taps in Cast Iron	Price	Code
No. 00	0" to 3/16"	to 1/4"	\$35.00	Phlam
No. 0	to 3/8"	to 1/2"	\$50.00	Phlanz

The principle on which this style is designed is especially effective on very small tapping; whereas in the **No. 0** size the Frictional Grip is greatly **INTENSIFIED**, to cover a wider range, without loss of sensitiveness.



Errington Mechanical Laboratory

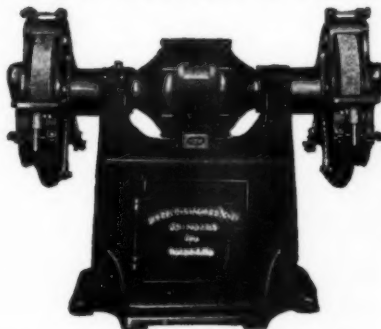
Main Office and Works: STATEN ISLAND, New York

Chicago Office:
6415 N. Richmond Street

New York Office:
200 Broadway

Boston Office:
830 Old South Bldg.

MARSCHKE HEAVY DUTY GRINDERS and BUFFERS



An important item accounting for the fact that we are now manufacturing the MARSCHKE HEAVY DUTY GRINDERS and BUFFERS, is our own experience with these machines.

We have been using several different types and sizes of Marschke Grinders and Buffers for so long that "the oldest man" of the organization does not remember when they were originally installed.

Nor does anyone remember when any of these machines has given a bit of trouble and since that is the kind of machines we like to use, it's also the kind we like to make and sell.

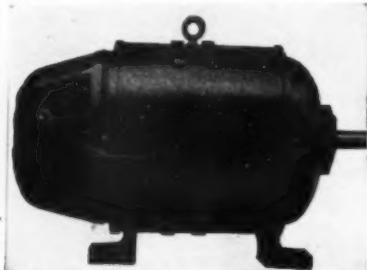
You, too, will appreciate the dependable durability of Marschke Grinders and Buffers manufactured by

VONNEGUT MOULDER CORP.
1805 Madison Ave., Indianapolis, Ind.

A Catalog showing machines with 10" to 30" wheels and 1 to 25 H. P. motors will be sent promptly upon request.

Reliance Reversing Motor-Drive for Planers

An improved design of reversing motor-drive for planers, makes use of armature speeds of 150-600 r.p.m., and 100-600 r.p.m. as against former standards of 250-1000 r.p.m. and 200-600 r.p.m. Full horsepower capac-



ity is said to be maintained over the entire range. Since there is less stored energy in the armature at the reduced

speeds it stops more quickly and gets under way faster at the end of each stroke. Time clipped from the reversal period is changed to cutting time with a consequent improvement in the production record of the planer.

Improvements in the control equipment include a new pendent control station with extra buttons which bring added convenience for setting-up operations.

The master reversing switch mounted on the planer bed has been made direct-acting to speed-up its operation.

The rheostat panel for control of cutting and return speeds is now a separate unit so that it can be mounted within easy reach.

Design features of the main control panel combined with improved electrical design of the motor also contribute to speedier action.

Address The Reliance Electric & Engineering Co., 1042 Ivanhoe Road, Cleveland, O., for further details—and save time by using Coupon No. 53.

Johansson Division
Dept. C

FORD MOTOR COMPANY

Dearborn, Michigan

Please send me, free, Catalog No. 12.

6

NAME _____

ADDRESS _____

CITY _____

STATE _____

NOW



JOHANSSON

RECONDITIONS 2, 3 AND 4-INCH BLOCKS

Reconditioned Johansson Gage Blocks have been available in sizes 5-inch and larger. Now, by a new, exclusive process, they can be reconditioned also in sizes 2, 3 and 4-inch. A degree of accuracy equal to that of new blocks is guaranteed. Reconditioning practically doubles the life of the blocks. The cost is only 60% of the cost of a new block—25% of new-block cost for blocks 5 inches or larger. The usual 20 cents an inch inspection charge will be made. Reconditioned blocks will be

returned to owner in about two weeks if the blocks are not too badly worn to be reconditioned. Blocks may be reconditioned a second and third time.

This new Johansson achievement greatly reduces replacement expenses. Only Johansson offers this saving. It is a fact to bear in mind when buying gage blocks. For complete information, including prices, on Johansson Gage Blocks and Accessories, fill out and mail the coupon.

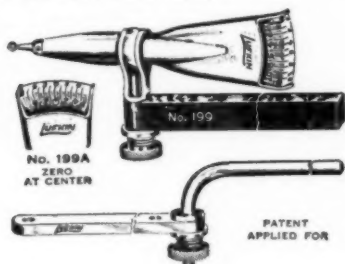
Johansson
ACCURACY



Lufkin Universal Indicator

The Lufkin Rule Co., Saginaw, Mich., has just added universal indicator No. 199 to its line of precision tools. It has rotating head, positive lock, and two reading faces; it can be used and read in any practical position.

Among its unique and valuable features is the location of the reading faces. One of these is on its front or flat side, the other on the end or top, making it especially suitable for jig boring, milling machine and drill press work. In such work, the end graduation enables reading without a mirror. Also when used with a surface gage and vernier height gage, end reading is the convenient way.



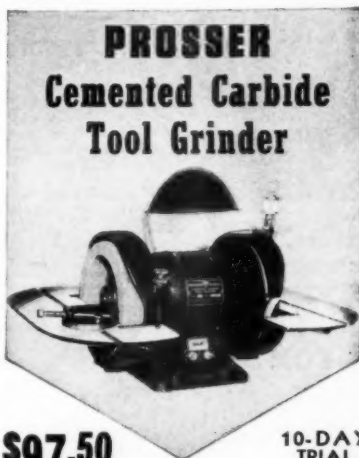
The indicator, which is one unit, makes a complete revolution on its own center and also on the clamping bolt. This forms practically a universal joint, all locked in position by one thumb nut. The frictionally held contact point can be set at any position in a half circle.

A standard bar for general use and a special attachment for use in drill chuck or surface gage and with vernier height gage are furnished with each indicator. The clamping device frictionally holds the indicator in position during set-up.

The housing is of tough, rust-proof metal. Contact point and all working parts are hardened.

No. 199 has zero at extreme left, and reads left to right. No. 199A has zero at center, and reads to the left and to the right.

A plush-lined case with spring-hinged cover can be supplied.



\$97.50
COMPLETE

10-DAY
TRIAL
OFFER

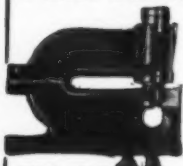
INCREASES TOOL LIFE REDUCES TOOL BREAKAGE

This modern Cemented Carbide Tool Grinder not only removes metal fast when rough grinding but also finish grinds tools to smooth, keen cutting edges. A diamond wheel can be used for finish grinding instead of silicon carbide wheel regularly furnished.

When equipped with proper wheels, this grinder is unexcelled for the proper grinding of high speed steel, Stellite, and all other types of cutting tools.

Write for details.



PERFORATING DIES

WALES individual, sub-press type units for press or press brake. Capacities up to $\frac{3}{8}$ dia. in 14 gauge — also square and Vee notching dies.

Write for Bulletin A

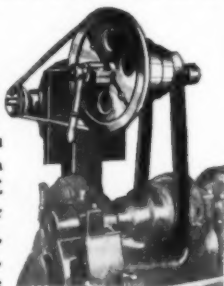
THE STRIPPIT CORPORATION
1559 Niagara St., Buffalo, N. Y.

Barber - Colman Combination Reamer, Hob and Cutter Sharpening Machine

The new B-C combination machine handles the triple job of sharpening reamers, hobs and cutters. It does not have some of the highly specialized features of the B-C automatic hob sharpening machines and the B-C reamer sharpening machines which are designed for economical large volume

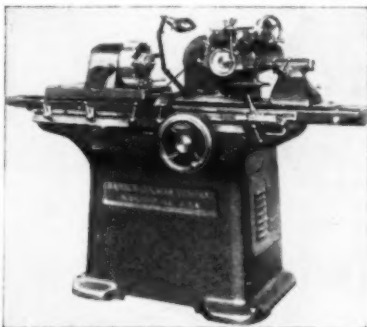
GUARANTEED FOR 5 YEARS

When you purchase a **STEEGE Drive** for your lathe, shaper, miller, etc., you're protected by our broad 5-year guarantee.



STEEGE Drives are easily installed—prices \$35.00 up—sent on 30 days' approval. *Let us send catalog.*

W. L. STEEGE MACHINERY CO.
(Our 23rd Year)
548 W. Monroe St., Chicago, Ill.



production. However, the combination machine does enable many shops to enjoy the advantages of positive mechanical control of sharpening operations, previously denied because of insufficient volume of work to justify the automatic sharpening units.

ELIMINATE SPECIAL AND COSTLY JIG FIXTURES

By Using Yost Drill Press Vises

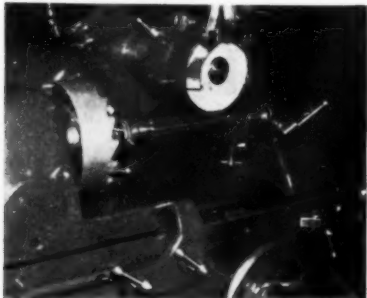
They are heavily constructed and very compact. Three flanges on the base permit easy attachment to machine or drill press table. A "V" shaped slot milled in the movable jaw permits a positive locking of vertical work. The ease and simplicity in operating makes this tool an indispensable factor in the execution of drill press operations.



Write us for circular "9-H", giving us name of your nearest dealer.

YOST MANUFACTURING COMPANY, Meadville, Pa.

The new combination machine provides for a wide variety of standard sharpening operations. In addition, several specialized sharpening operations may be handled with greater speed and economy than formerly, with no sacrifice of accuracy.



Following of spiral leads, indexing, diameter size, blade profile, feed to wheel on tooth face grinding, diameter

cutting clearance, relief clearance, wheel dressing, radial faces on high spirals—all of these important sharpening factors are under positive mechanical control. All mechanical movements of the machine can be duplicated, assuring uniformity of work on any number of pieces.

The unit will sharpen any make of reamer, with the positively-controlled sharpening characteristic of the Barber-Colman system. The machine is equally adaptable for sharpening hobs, affording accuracy of index, tangent bar control of gash spiral, true radial faces even on high spiral hobs and positive feed control. The machine is also capable of sharpening milling cutters where better-than-average accuracy is required.

An attractive 8-page, 2 color bulletin gives complete information on the machine and shows a great many close-up photos of the different sharpening operations. A copy will be mailed on request—and please use Quickmail Coupon No. 62.

TUNGSTEN CARBIDE GRINDER RESTS

**One-Piece Inserts 30" in Length and Longer
and Brazed to Centerless Grinder Rest Blades**



A TOUGH Tungsten Carbide Alloy Metal of proven superiority and LOWER COST. Extremely dense surface and Rockwell A hardness of 88 to 90 prevents marking or scoring of the work. Tungsten Carbide blades reduce down-time, grinding expense, replacement costs, and maintain greater accuracy. Life is increased 30 to 50 times over cast-iron or steel blades.

**SEND SKETCH OF BLADE FOR
QUOTATION**

Manufactured by

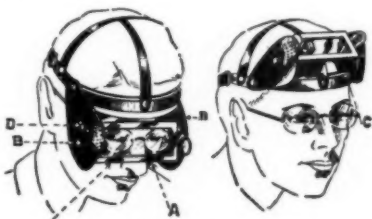
METAL CARBIDES CORP., YOUNGSTOWN, OHIO

Jackson Eyeshields

The new means for eye protection in industrial processes is afforded by this device, which while not intended to replace goggles for all uses, in many instances is claimed to be better.

It consists of a comfortable, light headgear to which an assembly is attached comprising lens frame (A) and two side protection members (BB). The entire assembly can be pushed up, out of the way (C) when not in use.

The lens frame swivels at (D) to adjust the lens angle and provision is made for easy adjustment of the distance from the face. Standard Federal specification lenses are used, protected by cover glass.



Three types are available. One for blow torch work, gas cutting and general maintenance welding, has lens frame and side pieces of light, opaque material. Another model, use in gun, spot and flash welding, pouring metal and general grinding operations, has lens frame and side protection shields of transparent non-inflammable material. A third model is designed particularly for the use of gas welders on automobile body work and similar production operations and for gas welding inspectors and welders' helpers. The lens frame is cut away sufficiently on the under side to allow vision under the lens as well as through the lens, without adjusting the lens frame.

Advantages claimed for these shields include wide vision, lightness and no irritation of nose bridge. The manufacturers—Jackson Electrode Holder Co., Detroit, Mich., assert from experi-

BURKE MILLING MACHINES

Make Fast Work of Small Jobs

Motor
Driven

Timken
roller or
ball bear-
ings to
spindle



Write today for
circulars.

Burke Machine Tool Co.
297 E. 16th St., Conneaut, Ohio











This Flexible Shaft Unit is ideal for grinding, polishing, carving, burring, filing, etc. BECAUSE motor is 1/10 h.p. possessing many times more power than hand-grinders. BECAUSE continuous use of our handpiece will not heat it up since ball bearing. BECAUSE handpiece fits operator's hand to perfection. Only $\frac{3}{4}$ " O. D. Tiring of hand impossible. No vibration. BECAUSE Rheostat permits of variable speeds up to 12000 r. p. m. 600 different burs, files, felts, rubbers, wheels and stones in stock. Write for catalog.

American Rotary Tools Co., 44 Whitehall St., New York, N.Y.

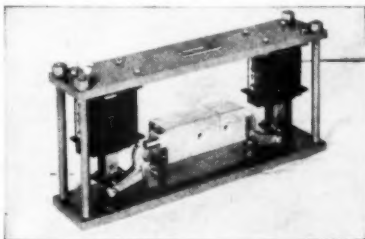
ence that workmen willingly wear these shields in proper position, thus avoiding injuries that often result from improper adjustment of older types of eye protection devices.

Double Solenoid Air Control Valve for Small Cylinders

A new 4-way double solenoid high-speed air control valve for $\frac{1}{8}$ " I.P.T. size is offered by C. B. Hunt & Son, Salem, O. Made in one size only, it is suitable for air pressures up to 200-pounds for operating cylinders under 3-inches in diameter with correspondingly short strokes. It operates on G. E. 290-D solenoids with low amperage characteristics and employs no springs. Current is "On" only during the instant valve is being actuated.

Valving action is accomplished with but a single moving part, the valve plunger. The plunger moves back and forth without any metal to metal wear. The plunger itself is of stainless steel, and its action is characterized by the manufacturer as "free-floating" in spe-

cial composition packings. It is claimed that an increase in air pressure only tends to tighten the air seal making leakage impossible. The manufacturer, on this account, unconditionally guarantees the valve against leakage.



The valving units without solenoids and assembly are available to users who desire to develop their own methods of operation.

Address the makers on your letterhead for full details, and please mention The BLUE BOOK.

Save Shop Time *with* Triplex Flat Heads

It's profitable to use Triplex Flat Head Cap Screws on all flush jobs. They speed your assembly—save time by fitting quickly and accurately into countersunk holes. Heads properly formed and shaved—threads clean cut—pointed for quick starting. Avoid misfit worries. It's smart buying to specify Triplex for screw product economies.

Write today for samples and prices

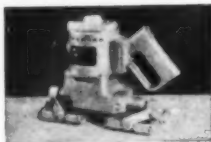


The Triplex Screw Company
5377 GRANT AVE., CLEVELAND, OHIO

TRIPLEX

CAP AND SET SCREWS, BOLTS AND NUTS

Millions Sold—Used in Every Industry

Sanding and Polishing Machines

**Portable
Electric
Disc and
Oscillating
Types.**

*Write for
circular.*

THE NEDCO COMPANY
87 Rumford Ave., Waltham, Mass.

GRANT

RIVETERS

Available in Noiseless Spinning
and Vibrating Hammer types
—also Vertical and Horizontal
Multiple Spindle Spinning Ma-
chines.



You're invited to send
unriveted samples for
recommendations and
quotations—NOW.

**THE GRANT MFG.
& MACHINE CO.**
C. E. Station
BRIDGEPORT, CONN.

**Thermit Issues Two
Booklets**

A new 34-page booklet describing the Thermit welding process and its applications is announced by the Metal & Thermit Corp., 120 Broadway, New York.

More complete than anything published previously on the subject, the new booklet gives the history of Thermit welding; describes the nature of the Thermit reaction, by means of which superheated liquid steel is produced for welding purposes; discusses the physical properties of Thermit weld metal; outlines the methods employed in welding. In addition, the advantages and economies of the process, for emergency repairs in the marine field; for repairs throughout industry to machine frames, crankshafts and other heavy parts; for reclamation work in steel mills; and for rail welding on steam railroad, street railway and coal mine track, are thoroughly covered. Also, several pages are devoted to Thermit for foundry use, and to the pure, carbide-free metals and alloys produced by the Thermit reaction and used for alloying purposes in the manufacture of steel and non-ferrous alloys.

The other publication is a new edition of the handy, pocket size pamphlet on Murex welding rods.

Considerably revised and enlarged, the new issue contains brief data on the physical properties and chemical analysis of the weld metal deposited by each of the 20 odd electrodes in the Murex line. Included are individual,



Why Not Buy The Original Electric Etcher?

MARK IRON AND STEEL

Tr. ETCHOGRAPH WAY

New ELKONITE TIP pencil.
New Baby Grand Model at a
lower price.

**2,000
in use**

WILLIAM BREWSTER & CO., INC.
42 Church St., New York, N. Y.

specially designed electrodes for high speed, downhand welding of mild steel; for all-position welding; for horizontal fillet work; for welding manganese, carbon-molybdenum and nickel steels; for several types of stainless steels; and, for a number of the new high-strength, low-alloy steels.

WYCO Offers A New 3-Speed Grinder

A new model grinder, adaptable to a wider variety of shop operations due to its greater speed range is presented by Wyzenbeek & Staff, Inc., 838 W. Hubbard St., Chicago.

The new unit should be particularly useful in tool rooms, machine shops, pattern shops, experimental laboratories, sheet metal shops, general automotive shops, etc.



The 10A, $\frac{1}{4}$ h.p. model has a 900-1800-3600 r.p.m. speed range. Three different $\frac{1}{4}$ h.p. models are offered—two with a 2400-3600-4800 r.p.m. speed range, and the other operating at 1800-3600-7200 r.p.m. The 20AI $\frac{1}{2}$ h.p. model gives a range of 2400-3600-4800 r.p.m., and the 20-AA $\frac{1}{2}$ h.p. model runs at 900-1800-3600 r.p.m.

Flexible shafts for the $\frac{1}{4}$ h.p. models at 4 ft. long; for the $\frac{1}{2}$ h.p., 5 ft. long and for the $\frac{1}{2}$ h.p. unit, 6 ft. long.

Shipping weight, knocked down, is 100 lbs.

TREE COLLET INDEX FIXTURE



Think how handy this fixture will be in your tool room —on the magnetic chuck of a

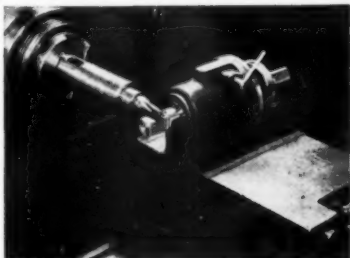
surface grinder, grinding square, hexagon and other shapes of punches to size after hardening—for sharpening fishtail, woodruff and other types of cutters.

Held in a milling machine vise or bolted to table it will mill all shapes of punches, small cutters and pinions. Very useful in your experimental room for milling multiple keyways, flats, slots and notches. You are wasting time in using a large dividing head for small work.

This fixture has a hardened and ground spindle that takes collets up to $\frac{3}{8}$ " and is adjustable for wear. Index plate has 24 holes giving 2, 3, 4, 6, 8, 12 and 24 divisions. Locking pin is operated by rack and pinion and is hardened. Base is cast iron accurately ground on bottom and sides parallel with spindle.

Write and let us tell you more about this indispensable tool room fixture.

Tree Tool & Die Works
Racine, Wisconsin



Skilsaw Catalog No. 40

A new Skilsaw catalog, the most complete and elaborate issued so far, is ready for distribution. Comprising 54 pages in a striking 3-color cover, it presents an impressive introduction to the Skilsaw line. Handy index tabs make it easy to find the different items of handsaws, drills, belt sanders, disc sanders, grinders, blowers and floor sanders. Cutaway views reveal the internal construction of the different tools and full descriptions and specifications are given — also views of typical jobs. Address Skilsaw, Inc., Dept. A, 3318 Elston Ave., Chicago, Ill., for a copy of catalog No. 40.



Kloster Issues New Tool Steel Bulletins

The Kloster Steel Corp., Justine and Fulton Sts., Chicago, has issued four new bulletins covering items in their line of tool steels:

"Swed-Oil", a Manganese-Chromium-Tungsten steel that is oil hardening, non-shrinking and recommended for cutting tools, dies and gauges.

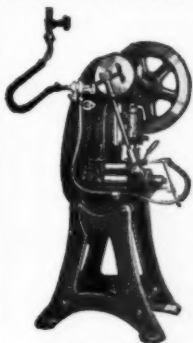
"Hi-Run", a high Chrome, high Carbon production steel recommended for tools and dies for swedging, pressing, coining, shearing and compressing operations.

"D-C-33", a low Carbon-Chrome-Silicon - Tungsten - Molybdenum steel recommended for hot working tools and dies on upsetting machines, presses and hammers handling heavy work.

"D-C-66", a Chrome-Tungsten-Vanadium hot work steel which resembles a high speed steel in its properties and is recommended for tools and dies, particularly where high temperatures are a working factor.

In writing for copies, please mention The BLUE BOOK.

LITTELL Air-Blast Valve for Faster Safer Production



PAYS its cost in a few weeks time in — increased production — greater safety — economy of air. Automatically ejects pieces. Operator's hands are never in danger zone. Quickly adjustable air nozzle.

Automatic Roll Feeds—

dial feeds, magazine feeds, hopper feeds, for punch presses. Reels for coiled stock. Send for Circulars.

F. J. Littell Machine Co.

4153 RAVENSWOOD AVE., CHICAGO, ILL.

HOW MUCH COMFORT CAN YOU BUY?



ROOMS
from \$150
WITH
BATH
\$175
also
WEEKLY
RATES

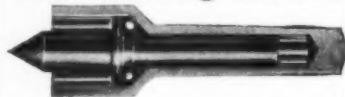
• A wonderful bed, a clean, quiet room; pleasant, efficient service; and a friendly atmosphere — these are what you get, and all you pay for, at the Madison-Lenox. No frills — just genuine comfort and consequently, genuine economy. An excellent location, with garage nearby.

VERNON W. McCOY, Gen. Mgr.

Detroit

HOTELS MADISON AVENUE AT
GRAND CIRCUS PARK
MADISON and LENOX

Something entirely new in Economical Live Ball and Roller Bearing Centers



For lathes, hand screw machines, grinders and mills. A simple and yet practical construction.

Long, sturdy heavy-duty spindle.

Radial roller bearing in front end of spindle for smooth operation and strength. Roller bearing in back end of spindle for free-running and alignment.

Vee and angular thrust ball bearing to insure constant accuracy and be absent from chatter and end-play.

Large spindle, small head and short over-hang spells rigidity.

Equipped with special seal to retain lubricant and keep out foreign matter.

A lower cost to you than any other live center on the market.

A folder giving prices and complete detail will be mailed to you just for the asking.

Send us your order for one today and we will give you a ten days free trial and if not satisfactory in every way just return it.

MOTOR TOOL MFG. CO.
12281 Turner Ave., Detroit, Mich.



Why Not Modernize

your present equipment by using the RUSSELL BORING BAR? Bores holes from 9/16" to 12" dia. with axis of boring bar parallel to axis of the shank, in one compact tool, with micrometer adjustment.

RUSSELL BORING BAR CO.
MIDDLETOWN, OHIO

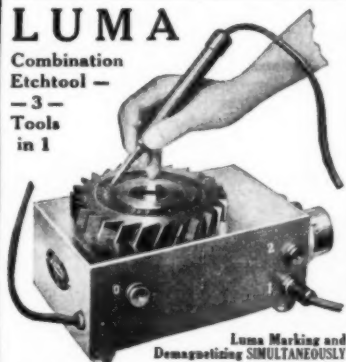
Improved Mauser Vernier Caliper and Height Gage

George Scherr offers an improved Mauser precision tool, useful as a vernier caliper and a height gage. A combination quick action cam lock and fine adjusting screw permits easy setting to close limits of accuracy. The cam lock is released by pressing the fine adjusting screw until approximate measurement is obtained. Then, in order to obtain fine measurements in 1/1000-in., the adjustment screw is turned, while the cam lock remains closed.

This instrument, known as model 407-R, is 9-inches long, with a measuring capacity of 6 1/4-inches and measures in 1/1000 and 1/128-in. It comes with an accurately lapped steel base and scriber, attached to the caliper jaws, thereby quickly transforming the tool into a height gage. It also has two knife-edges which are useful for layout work, for measuring distances between holes and for measuring root diameters of gears, threads, etc.

LUMA

Combination
Etchtool —
— 3 —
Tools
in 1



Luma Marking and Demagnetizing SIMULTANEOUSLY

Writes on hardened steel — demagnetizes at the same time—with carbon point does light spot annealing and soldering jobs. Compact—easy to use—dependable.

Send for details—5-day FREE TRIAL OFFER!

Luma Electric Equipment Co.
Dept. H—Main P. O. Box 132, Toledo, Ohio

Publication is announced of a new four-page folder, which discusses precision measurements and various applications of Mauser tools. Outside diameters and thickness, inside diameters, distance between bores, depth measurements and height gage work such as scribing and layout are covered. A supplementary folder lists fourteen benefits that both employers and mechanics derive by the use of vernier calipers in shop and plant. Copies will be sent on request by the George Scherr Co., 122 Lafayette St., New York, N. Y.

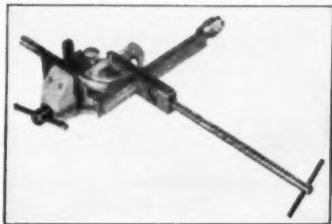
SAC Tube Shaping Tool

A four-purpose tool for bending, cutting, flaring and swedging tubing is offered by the Sac Tool Mfg. Co., 1907 Washington Ave., St. Louis, Mo.

Recommended particularly for copper, brass and aluminum tubing, the tool is simple in construction and operation.

Sawing capacity is up to $2\frac{1}{8}$ -in. o.s.d. One tip is used for all sizes of flares. Separate tips are required for

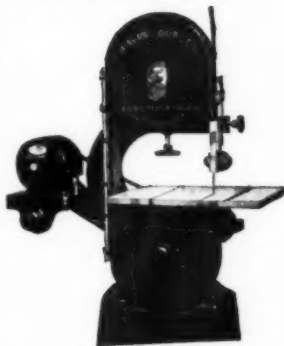
each size of swedge. The handle with flare or swedge tip is forced into the tube by means of the screw handle. The tool can be used to make coils, fittings and reducers or increasers.



The regular tool equipment is for bending $\frac{3}{8}$ -1-in. radius, $\frac{1}{2}$ -1 $\frac{1}{2}$ -in. radius, $\frac{5}{8}$ -2-in. radius and $\frac{3}{4}$ -2 $\frac{1}{2}$ -in. radius o.s.d. soft temper tubing. Flaring and swedging equipment is for $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$ and $\frac{3}{4}$ -in. o.s.d. Circular blocks for other radii can be furnished.

Address the makers for further details, and please mention The BLUE BOOK.

RACINE Duplex Band Saw



Two Speeds — for cutting wood, steel, brass, copper, tubing, angles, templates.

The ideal all around machine for production shops, tool rooms, pattern shops, laboratories.

Accurate—Fast—Rugged. Modern, High Grade Construction.

"Standard the World Over"

RACINE TOOL & MACHINE COMPANY

1754 STATE ST.

—.

RACINE, WIS. U. S. A.

Doall Performance Bulletin

New information on filing and sawing speeds with contour machining is given in an illustrated folder announced by Continental Machine Specialties of Minneapolis, manufacturers of Doall equipment. Filing output as measured in ounces of filings per hour is shown for seven materials in common use.

Radii accomplished with each of even widths of saw blades, correct sawing and filing speeds for more than 18 materials, and other data on selec-

tion and use of the cutting tools employed for contour machining are given. Full size illustrations of the new saw blade and recently developed smooth cutting band files are also shown. A diagram of the automatic butt welder used to join the saw blade when making up bands or for internal cutting is provided as well as a skeleton photograph of operating Doall parts. This photograph reveals the means of obtaining the infinitely variable speeds of 50 to 1500-feet of blade travel per minute required to give the most efficient cutting of the wide range of materials that may be handled.

For Every Coolant Need ...

There's a GUSHER Coolant Pump of the proper type and the right size for every coolant need — and GUSHER Pumps stand up in the hardest kind of service.

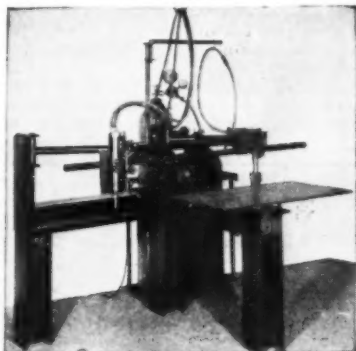
They're self-priming—have fewer wearing parts—never require re-packing—no metal-to-metal contacts—bearings are protected from abrasive matter.

Send NOW for full information.

The Ruthman Machinery Co.,
538 E. FRONT ST., CINCINNATI, O.

The Hayes Torch Machine

The man who has occasional need of torch cutting machinery should find that the Hayes equipment will perform



the jobs he required without the heavy investment involved for delicate and elaborate cutting machines.

ANNOUNCING THE IMPROVED M-B "SUPER-SPEED" AIR GRINDER

Steel Construction
Throughout
Positive Quick Acting
Air Control Valve
Operates on Air
Pressures of
40-100 Pounds
M-B PRODUCTS

THRILLING
SPEEDS



AMAZING
POWER

The ONLY Hand
Grinder With
Spindle Speed
of 100,000 R. P. M.
On 100 Pounds
Air Pressure
WRITE FOR DETAILS
130 E. LARNED ST.
DETROIT, MICH.

The device is a pantograph unit with tracing wheel to follow the contour of any templet, or the lines of any drawing. Movements of the torch exactly duplicate those of the tracing wheel.

The L-shaped frame affords the necessary rigidity and leaves space for the material to be cut at the left of the tracing table.

Power to move the tracing wheel is provided by a motor plugged into the lighting circuit. From the jackshaft, a flexible shaft carries power to a speed reducer at top of the tracing wheel assembly.

Carrying arrangement for the torch permits it to be moved up and down, and also slanted for cutting a bevel on the side of a plate.

For circle cutting an arm hinged at the middle of the table is attached to the side of the tracing wheel assembly.

To duplicate any piece of irregular plate, trace around it with pencil, transfer the paper to the table and follow the lines with the tracing wheel.

Tracing wheel and torch are arranged

to run at speeds of approximately 5, 10, 12 and 24-inches per minute. The latter speed is recommended for 1/2-inch and thinner material, on straight lines or easy curves. The other speeds are for more intricate patterns or thicker material.

The complete machine weighs 625-lbs. and requires a floor space 4-ft. 2-in. x 9 1/2-ft., to allow for extreme movements of the pantograph.

For Bulletin giving more complete information, please address the Hayes Track Appliance Co., Richmond, Ind.

Mall Red Streak Drill Bulletin

An 8-page 2-color bulletin presents the many different models of Mall portable electric drills. In the center spread, two large cut-away views show intimate details of the interior construction.

Copies of the bulletin may be had by addressing the Mall Tool Co., 7740 So. Chicago Ave., Chicago, Ill.



Your copy is sent without obligation...
Just fill in and mail the coupon

Announcing...

the New Hamilton Catalog of Drafting Room Furniture

For latest information on Drawing Tables, Filing Equipment, and Drafting Room Accessories ... refer to the new 64 page Hamilton catalog. It contains helpful suggestions on filing tracings and drawings ... shows 26 different styles of drawing tables ... has a full description of the complete Hamilton Line of Drafting Furniture.

HAMILTON MFG. CO.,

Two Rivers, Wis.

**HAMILTON MANUFACTURING CO.
Two Rivers, Wisconsin**

H-9-38

HAMILTON

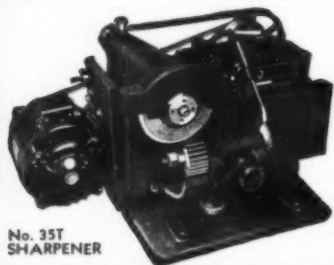
Send me your new Eleventh Edition Catalog of Drafting Room Furniture

Name and Position.....

Firm.....

Address.....

City and State.....



No. 35T
SHARPENER

AUTOMATICALLY SHARPENS METAL SAWS IN GANGS

Up to $5\frac{1}{4}$ " diameter and up to $1\frac{3}{4}$ " thickness.
100 SAWS of 16 GAUGE CAN BE SHARP-
ENED AT ONE TIME.

The saws are automatically indexed and sharpened within a variation of plus or minus .001 of exact diameter of entire lot.

WRITE FOR CIRCULAR

The WARDWELL MFG. CO.
3165 FULTON RD. CLEVELAND, O.

SHELDON

Arbor Presses

Made in 12 sizes
from $\frac{1}{4}$ to 10 tons
Pressure.

Plain and Swivel Milling Machine Vises

4 sizes— $\frac{3}{8}$ " to $\frac{8}{16}$ " inch Vises

Also
Drill
Press
and
Shaper
Vises.



Send for Catalog and Price List.

SHELDON MACHINE CO.
3257 Cottage Grove Ave., Chicago, Ill.

Multi-Seal Front Drive Pipe Connector

Maintenance and construction engineers should welcome the Multi-Seal method of attaching pipes to containers without the necessity of getting on the inside.



In application, the connector is inserted in the hole, and holding the body with a wrench, the action nut is tightened. It is then ready for connection of the line.

The device is offered for use on steam, gas, oil, water and air and is said to withstand high pressures. It is of all steel construction. The compression cylinder, located between the head of the pipe and the connector shank moves up on the shank taper, expanding and compressing to the inner surface of the job as the smaller or action nut is tightened. The compression cylinder takes the convex curvature of the inside surface. The pipe end has a standard taper thread.

For additional information address the Multi-Seal Mfg. Co., 123 N. Jefferson St., Chicago, Ill., and please mention The BLUE BOOK.

Homo Nitriding Catalog

Heat-treaters using the Homo Method are now nitriding tools and production parts to exacting specifications—with cases uniformly hard, uniformly deep—it is stated in "Homo Method for Nitriding", a 16-page catalog just issued by the Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia, Pa. Profusely illustrated, the new publication includes graphs showing the effects of time and temperature on surface hardness and case depth. There is a novel photo-diagram which reveals how the forced-convection principle, applied in a furnace designed especially for nitriding, makes possible highly uniform case hardening. And numer-

ous photographs show the equipment in actual use; illustrate what is said to be its fundamental simplicity of operation. A copy of the catalog will be sent promptly to anyone interested. In writing please mention The BLUE BOOK.

New Method Steel Stamps

A number of advantages are claimed for these stamps, such as: freedom from mushrooming or chipping; over-size shanks for longer stamp life; exclusive thumb grip on front; exclusive knurled back to prevent slipping out of fingers; broad rounded corners on shanks, etc.

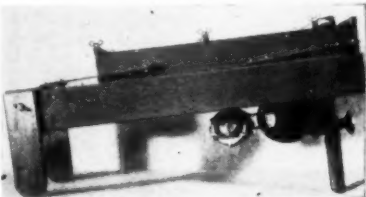
The single letter and figure hand stamps are offered in character sizes ranging from 1/32 to 1-inch.

Interchangeable type holders of various styles, embossing dies, roll dies for use on lathes or screw machines, steel stamps for punch press or machine marking, inspectors' stamps, and hand stamps with characters cut in the forging are all shown in the new bulletin recently issued by New Method Steel

Stamps, Inc., 149 Jos. Campau, Detroit, Mich. Copies will be mailed on request and in writing please mention The BLUE BOOK.

Ajax Batch Screen

Ajax Flexible Coupling Co., Westfield, N. Y., offer a new batch screen, with single deck cloth area 12x24-in. Overall dimensions are 36x18x15-in.



Motor is of 1/12 h.p., capacity driving a 3B Ajax-Shaler shaker by V-belt. Screen is totally enclosed, dust tight with feed and discharge spouts arranged for boots.

"If it's a Spot Welder, we make it"—from a filament .0005" to a door welding.

We manufacture the most complete line of standard and special electric spot welders from 1/4 to 500 K. V. A., some as low as \$25.00.

We also manufacture special welding transformers to suit your requirements.

Ask for our catalog No. 38W showing over 1250 interesting illustrations—press type air operated, plunger type foot operated and motor driven welders.

Send us your welding problems for quotations.

We manufacture a very complete line of welding tips and water-cooled electrode holders for difficult welding jobs.

We also do Job Spot Welding.

EISLER ENGINEERING COMPANY, Inc.

762 So. 13th St., Near Avon Ave.,
Newark, New Jersey

EISLER

SPOT WELDING

**FOR STRONG
ACCURATE
COMPACT
AIRCRAFT
WORK**

Industry Takes to Speedway "Tiny" Drills

There was a time when tools were easily classified as "industrial tools", "home tools" or "toys", and that was that. Today, it seems no such fine line can be drawn. Strictly industrial machine tools are finding their way into home hobby shops in astonishing numbers while even homecraft drill presses, band saws, toy clamps, hand grinders and drills not built to theoretical industrial standards are becoming common in plants large and small.

A typical case is the new Speedway No. 250 home drill and grinder kit, consisting of a miniature drill, a hand grinder and 5 accessories. Toy-like in size, weight and price, and finished in colorful blue crackle enamel, these new tools were designed for home use. Care was taken in advance instruction to salesmen and representatives in making this point clear. Repeated warnings that the tools are built for

intermittent rather than continuous use seem of no avail. Industry insists on buying them for innumerable light jobs.

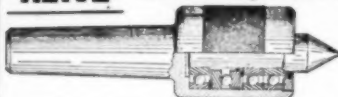


The drill is about the size and weight of a small pocket revolver and handles with much the same ease and accuracy. The grinder has been foreshortened to the proportions of a small apple and fits comfortably into the hand. Though exceedingly small it is claimed that these new tools pack a wallop—comparing with the power and performance of larger, heavier tools. The drill operates at 1000 r.p.m. and is rated for 1/4-inch in steel. The grinder operates at 20,000 r.p.m.

The steel case which comes with carrying handle is blue enamelled to match the tools.

Address the Speedway Mfg. Co., 1834 So. 52nd Ave., Cicero, Ill. for copy of new folder, and please mention **The BLUE BOOK**.

"ALIVE" Ball Bearing Centers



"They turn with the work"

Write TODAY — and let us tell you more about them.

MODERN MACHINE CORP.

323 Berry St.,

Brooklyn, N. Y.



**Machinists Tool
Grinding Co.**

2834 W. Lake Street
CHICAGO, ILLINOIS

WHY DISCARD DULL POWER HACK SAW BLADES?

Your dull blades can be sharpened over and over again at the low cost of 2½¢ per inch (12 blades or more).

Power Hack Saws Are Expensive to Scrap

Recut saws prove not only a money saver but a better cutting saw.

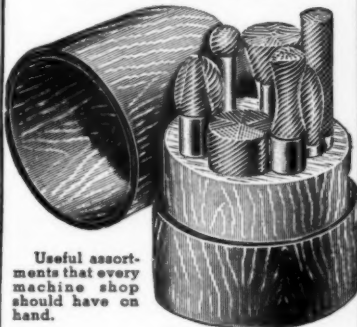
Lewis-Shepard Floor Truck

Lewis-Shepard Company, 245 Walnut St., Watertown, Mass., presents a newly-designed Floor Truck. This truck has many attractive features, such as arc-welded frame of special design with double side girders, which hold the hardwood top in place with a vise-like grip, eliminating the use of bolts. T-type steel end protection saves top wood from being chewed through rough usage. Casters are hung on four steel arch sections which allow a large kick space. The main wheels are suspended on a bridge type hanger. Axles are easily removable and are reinforced by means of a tubular axle housing. Hyatt roller bearings are used in all wheels.

Weight distribution and design allow easy steering and rolling, with a minimum amount of end tipping. Metal, solid rubber or pneumatic tires are available. Standard capacities are from 1,000 to 4,000 lbs.

Ask for Circular No. 232 and please mention The BLUE BOOK.

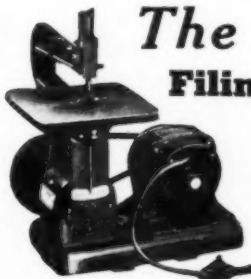
GROBET Hand Cut ROTARY FILES ARE THE BEST



Useful assortments that every machine shop should have on hand.

Ask for catalog WR

Grobet File Corp. of America
3 PARK PL. NEW YORK



The "BUTTERFLY" Filing and Die Making Machine

Saves cost in sawing, filing and lapping on dies, gauges, tools, etc.

In highest possible quality of material, precision of machining and nicety of adjustments, the "BUTTERFLY" Filing Machine is as painstaking a product as the finest watch movement—and just as reliable.

This skilfully-designed machine is named "BUTTERFLY" because it is as noiseless in its running as a Butterfly in its flying.

NOISELESS IN OPERATION

Made in its entirety under the direct personal supervision and exacting standards of the well recognized and able engineer, Leonard Markels. All parts are interchangeable.

Write for folder C. and E. L.

Harvey Manufacturing Corp.

MANUFACTURING PLANT AND
EXECUTIVE OFFICES

161 GRAND ST., — — NEW YORK, N. Y.

"Blue Devil" Safety Socket Screws

Distinguished by an attractive new gun metal finish and a number of refinements, "Blue Devil" safety socket screws enter the market.

The makers emphasize that the heads are cold-formed by a process which maintains the continuity and integrity of the metal fibers. Increased section of metal is provided at the vital junction of head and body.



The precision-formed hexagon sockets have straight sides free from taper, and the bottoms of sockets are clean-cut. Heads are concentric and shoulders are square.

The chamfered edge at the top is

knurled to facilitate handling.

Ultimately, the "Blue Devil" trade name will be applied to all of the Company's products.

For further information, address the Safety Socket Screw Corp., 4442 N. Knox Ave., Chicago, Ill.

Trico Thermal Plug Fuse

The Trico Fuse Mfg. Co., 5th St. at Chambers, Milwaukee, Wis., announces a new Trico-matic thermal time-lag fuse. It is the



Colortop plug fuse, to which has been added a built-in thermal overload cut-out. This holds starting and momentary overloads, yet gives protection on prolonged overloads, making overfusing unnecessary.

TRICO-MATICS can be used in place of ordinary fuses on circuits having motor driven machinery or appliances. They will fit the standard Edison base without special adaptors.

Our representatives will give you particulars.

Boston—Gen'l Mch. Corp.
Buffalo—R. C. Neal Co., Inc.
Chicago—H. F. Wolnick Mch. Co.
Cincinnati—D. B. Hubert
Cleveland—S. G. Morris
Detroit—Haberkorn & Wood
Grand Rapids—Joseph Monahan
Hartford—George M. Pearce, Jr.
Milwaukee—J. M. Grimstad
Newark—George M. Pearce
Philadelphia—W. A. Rankin (Drexel Hill)
Pittsburgh—J. A. Bouslough
Rochester—R. C. Neal Co., Inc.
San Francisco—R. W. Conroy
Seattle—Buckner-Weatherby Co., Inc.
Syracuse—R. C. Neal Co., Inc.
Toledo—Kirkby Machinery & Supply Co.
Canada—Geo. T. White Co. (Walkerville, Ont.)
Europe—Gaston E. Marboix, Ltd., London

Get in touch with them or write to us at 605 N. Mechanic Street, Jackson, Mich.

TOMKINS-JOHNSON

The RIVTOR

Automatically feeds and sets solid rivets up to and including $\frac{1}{4}$ " in diameter $\frac{1}{8}$ " long. The CLINCHOR for automatically feeding and setting all types of Clinch Nuts.

T-J CYLINDERS

To exert power movement from 100 lbs. to 12,000 lbs.—direct (air) from 1,000 to 50,000 lbs.—direct (hydraulic), and made in all the right styles and sizes.

On short circuits, the fuse element operates just like an ordinary fuse.

Special features include:—Color indicators for all popular sizes—all-porcelain shock and vent-proof top — a flag indicator when blown—large ampere rating on window—a flat releasing spring under copper link giving maximum travel in opening arc when blown and an arc-confining disc. Approved by Underwriters' Laboratories, Inc.

Complete information may be obtained from manufacturer. Please mention The BLUE BOOK in writing.

Pedrick Universal Bending Unit

Bending jobs of pipe, bar or flat stock can be handled easily and quickly in the field with a simple, portable machine offered by the Pedrick Tool & Machine Co., 3640 No. Lawrence St., Philadelphia, Pa. A wide range of bending jobs is made possible by easily-made adjustments, and an attractive feature of the device is the fact that does not have to be bolted down or



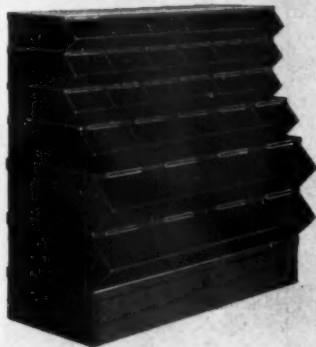
fastened to anything. When it is set down, it's ready for any job, and the powerful lever and ratchet combination is speedy and involves only a minimum amount of physical effort.

Larger and more powerful types of hand and power bending machines are also built by the Pedrick Co., as well as portable turning machines for engine crank pins, journals, shafts, axles and the Pleco automatic air pressure caulking gun.

Full details concerning any of these products will be sent on application.

"STACKBINS MAKE A STOCK HANDLING SYSTEM THAT CAN'T BE BEATEN"

... says large X-Ray equipment manufacturer



The combination of portable steel STACKBINS and simple records provides a stock-handling system which offers the utmost in convenience, simplicity and efficiency—the loss of expensive X-Ray parts is practically eliminated. This manufacturer's savings are typical of those enjoyed by hundreds of STACKBIN users.

STACKBIN sections are sturdy welded sections containing 2 to 6 compartments so constructed that they nest firmly into one another. The full-view hopper fronts keep contents from spilling and within easy reach. Smooth interiors speed up handling.

Whatever your storage or active stock problems may be, you'll find STACKBINS worth your investigation. Write today for complete STACKBIN literature giving full details and many useful ideas.

Stackbin Corporation

55 Troy St.,

Providence, R. I.

★ (name on request)

STACKBINS

"STACKED AND STILL ACCESSIBLE"

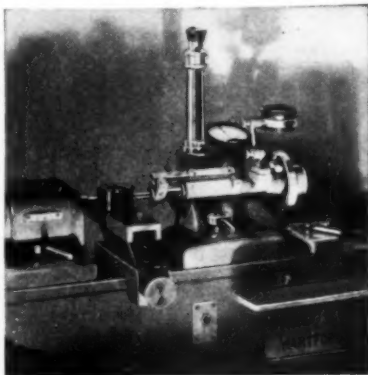
Pratt & Whitney Standard Measuring Machine with New Features

The Pratt & Whitney standard measuring machine is designed for checking gages, tools, parts, etc., right in the plant. Reading directly to one one-hundred-thousandth of an inch, this precision instrument assures the manufacturer of the accuracy of his products both in size and interchangeability. No calculations are necessary other than the direct readings to 0.00001-in., on the graduated dials.

Briefly the machine comprises a master bar, a dividing screw, and the new electrolimit pressure tailstock for controlling measuring pressures, all mounted on a rigid bed. Master bar is graduated at inch intervals providing a permanently accurate setting. The graduations are visible only through a microscope. The measuring head carries this microscope which has a hair line graduation used to match the hair line on the master bar. The

precision measuring screw which subdivides the one inch is also included on the measuring head.

It is asserted the new tailstock eliminates most of the so-called "human element" that always has been troublesome in precision measuring. This tailstock makes available any measuring pressure from one to 2½ pounds in increments of 8 oz., and it enables duplication of exact measuring pressure, even with different operators.



LET US QUOTE...



Our new modern plant is fully equipped with special machinery for

**COMMERCIAL JIG BORING,
DESIGNING AND BUILDING
of
DIES, JIGS AND FIXTURES
LARGE OR SMALL**

We can handle your Jig Boring jobs at reasonable prices on our new 18"x36" Pratt & Whitney Jig Borer. Quick service.

Have been delivering satisfaction since 1929—let us serve you.

QUALITY TOOL & DIE CO.

Ray W. Rice, Manager,
401 N. Noble St., Indianapolis, Ind.

On fine pitch threads and some small work, light pressures are preferable, whereas heavier work will not align itself between the spindles properly unless a heavier pressure is used. This is true particularly when measuring large threaded pieces by the "three-wire" methods. Changes in measuring pressure are made quickly by turning a knob until the desired pressure is reached, as indicated on a graduated scale which is calibrated in 8-ounce divisions.

By turning the dividing screw on the measuring head, the work is pressed against the tailstock anvil until the pointer of the microammeter reaches the center of the scale. Then the size is read on the graduated dial which is a part of the measuring head.

The tailstock operates on the same principle as the Pratt & Whitney elec-

trolimit comparators, continuous gages, etc. The unit contains a pair of balanced coils, each having independent magnetic fields. A common armature "floats" between them. This armature is a steel bar mounted on a flat spring pivot at one end. It is in continuous contact with the measuring anvil, so the least movement of the latter is transferred to the armature.

When a piece of work is brought against the measuring anvil, the armature is moved, unbalancing the mag-

netic fields of the two coils. This produces a relatively large unbalanced current for a very small movement. The result shows visibly in a corresponding movement of the microammeter needle.

A 12-page bulletin, No. 441 gives complete information and will be sent if you address Pratt & Whitney, Division Niles-Bement-Pond Co., Hartford, Conn. Please mention The BLUE BOOK.

BALDOR

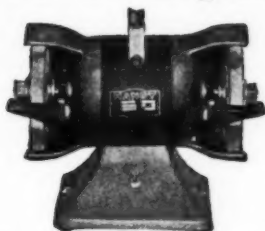
BALL
BEARING

GRINDERS 6" to 12"

A Complete Line BENCH AND PEDESTAL TYPES

\$19.50 to \$197.00

1 YEAR GUARANTEE



HEAVY DUTY — BALL BEARING

ABOVE, No. 548, 1/4 H. P. \$ 19.50

AT RIGHT, No. 121, 2 H. P. \$197.00

MAIL QUICKMAIL COUPON No. 18

BALDOR ELECTRIC COMPANY
4368 Duncan Ave., St. Louis, Mo.



BALDOR GRINDERS

are built by Motor Specialists

AMC Demagnetizer

Alofs Mfg. Co., 1615 Madison Ave., S. E., Grand Rapids, Mich., offer a demagnetizer of original design.

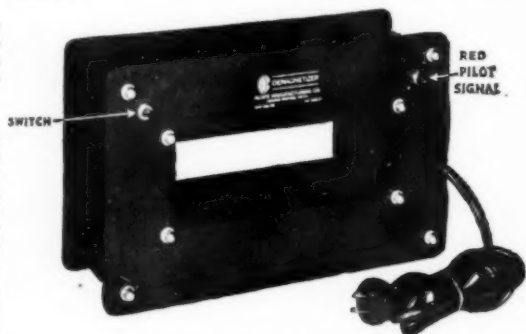
Rectangular in form, the overall size is 4x13x7 $\frac{1}{2}$ -inches with a center opening 2 $\frac{3}{4}$ x8 $\frac{1}{4}$ -inches.

Magnetized parts, passed through the field opening are instantly demagnetized. Large, flat surfaces can be demagnetized by sliding the device over their surfaces. The lightweight (15-lbs.) and portable construction makes this easy, and the fibre back plate will not mar polished surfaces.

The AMC may also be used for magnetizing. Applying hardened steel parts to the field and shutting off the

current will magnetize them.

A pilot signal, using a 2 $\frac{1}{2}$ -volt bayonet-type Mazda bulb is provided, indicating when the current is "on".



Larger sizes of demagnetizers can be supplied on order. Address the makers for further information, and please use Quickmail Coupon No. 55.



USEFUL In Any Modern Shop

This sturdy 36x48-inch Milwaukee Surface Plate is of semi-steel, accurately machined and securely mounted on cast legs, which are machined and provided with S. A. E. adjusting screws for perfect alignment.

Plate is one inch thick and provided with cross ribs every 10 $\frac{1}{2}$ inches. It is 4 inches deep throughout, with supporting pads in the corners for rigid attachment of legs to plate.

Spacers are provided between legs for stiffness and room is provided for a lower shelf.

Plate is first roughed out, left to season and then remachined to give a perfect surface. All edges are machined and square with top. Height from floor to top of plate is 30 inches. Shipping weight is 1000 lbs. Send **TODAY** for complete information and price.

J. C. BUSCH COMPANY

E. Pittsburgh Ave. and So. Ferry St.,

ENGINEERS AND MACHINISTS
SINCE 1907
MILWAUKEE, WIS.

NEW TRADE LITERATURE



PRATT & WHITNEY SMALL TOOLS

Pratt & Whitney, Division Niles-Bement-Pond Co., Hartford, Conn., No. 15 small tool catalog. 460 pages, 4 $\frac{3}{4}$ x7 $\frac{1}{4}$ bound in a handsome blue fabric cover embossed in silver bronze, illustrating and describing the full line of P & W taps, dies, screw plates, cutters, reamers, punches, drills, with engineering data, tables, specifications, etc. A copy will be sent if you request it on your business letterhead.

TRANSFORMERS, SPOT AND ARC WELDERS

Eisler Engineering Co., 750 So. 13th St., Newark, N. J. Catalog No. 38-T, 24 pages and cover, 8 $\frac{1}{2}$ x11, showing steps in transformer construction, various types built by Eisler, as well as the many different forms and types of welding machines.

ROTARY FILES

Grobet File Corp., of America, 3 Park Place, New York City. Catalog R-31 illustrating more than 200 kinds of hand cut, rasp cut and milled cut rotary files.

FRICTION CLUTCHES

Industrial Clutch Co., Waukesha, Wis. A 4-page, 2-color bulletin, 8 $\frac{1}{2}$ x11, presenting the advantages of the Industrial friction clutch for punch presses in the way of higher production, shockless engagement, lowered maintenance and less time out.

EX-CELL-O TOOL TIPS

The August-September issue of this splendid house organ presents eight 8 $\frac{1}{2}$ x11 pages of interesting material on broaching, grinding, boring equipment and the new carbide tool grinder. A list of current Ex-Cell-O catalogs available includes bulletins on boring machines, thread grinders, hydraulic

power units, carbide tool grinders, drill jig bushings, grinding spindles, counterbores and special tools, milling cutters, railroad pins and bushings and Diesel fuel injectors.

FAITH THAT LED TO FORTUNE

A handsome little brochure, 20 pages, 4 $\frac{3}{4}$ x7 $\frac{1}{2}$ and cover published by The Lincoln Electric Co., Cleveland, O. It relates in an interesting way, the story of Robert G. LeTourneau and his struggles in the development of a million dollar earth moving equipment business.

MILL AND SHAPER

Marlow Mill & Shaper Co., 1222 E. 28th St., Los Angeles, Cal. Six pages, 2-color, 8 $\frac{1}{2}$ x11, presenting full details and specifications of the Marlow precision bench type milling machine and shaper.

JOHANSSON GAUGE BLOCK INSPECTION SERVICE

Ford Motor Co., Johansson Division, Dearborn, Mich., six pages, 3 $\frac{1}{2}$ x6 $\frac{1}{4}$, explaining the new inspection and reconditioning service for Johansson gauges.

ELECTRIC SCREW DRIVERS

Stanley Electric Tool Division, Stanley Works, New Britain, Conn. Eight pages, 8 $\frac{1}{2}$ x11, 2-colors, presenting facts about Stanley electric screw drivers showing typical applications, types of tools and bits.

DIE AND MOLD DUPLICATORS

George Gorton Machine Co., Racine, Wis. 32 pages 8 $\frac{1}{2}$ x11 in color, bulletin 1319-B, showing the three Gorton machines of varying size that are available for duplication of plastic and glass molds, die casting dies, forging dies with many large illustrations and interesting text.

LATHES

The Sebastian Lathe Co., Cincinnati, O. Six pages, $8\frac{1}{2} \times 11$, 2-colors, introducing the new 10-12-13 inch Stremeline Sebastian lathes with pictures, description and specifications.

AIR CONDITIONING IN WELDING

The Lincoln Electric Co., Cleveland, O. Four pages, $8\frac{1}{2} \times 11$, with a trick flap, showing application and use of the Lincoln conditioner.

PORTABLE ELECTRIC DRILLS

Mall Tool Co., 7740 So. Chicago Ave., Chicago, Ill. Eight pages, $8\frac{1}{2} \times 11$, 2-colors, showing the full line of Mall portable drills, and cutaway views of mechanical construction.

HYDRAULIC HOBGING MACHINE

Barber-Colman Company, Rockford, Ill. Four pages, $8\frac{1}{2} \times 11$, 2-color, presenting the type "D" hydraulic hobbing machine, in illustration, sectional drawings, text and specifications.

GRINDERS

Queen City Machine Tool Co., 217 E. Second St., Cincinnati, O. Twelve pages, $8\frac{1}{2} \times 11$ in 2-colors, introducing the full line of Queen City grinders from the bench type up to the heavy duty buffers and new disc grinders.

HIGH PRESSURE DIE CASTING

Madison-Kipp Corp., 20 Waubesa St., Madison, Wis. Six pages, $8\frac{1}{2} \times 11$, 2-color, giving all the data on the new M-K high pressure automatic die casting machines.

ROLLER BEARING PILLOW BLOCKS

Shafer Bearing Corp., 35 E. Wacker Drive, Chicago, Ill. Four pages, $8\frac{1}{2} \times 11$, 2-color, giving full information on the super sealed pillow blocks.

DRILLING MACHINES

Buffalo Forge Co., 161 Mortimer St., Buffalo, N. Y. 12 pages, $8\frac{1}{2} \times 11$, 2-color, presenting the No. 18 drilling machines, available in 18 different models.

PNEUMATIC RIVETERS

Hannifin Mfg. Co., 621 So. Kolmar Ave., Chicago, Ill. Eight pages, $8\frac{1}{2} \times 11$, 2-colors illustrating and describing the full line of Allen portable and stationary pneumatic riveters.

FITTING GOGGLES TO WORKERS

American Optical Co., Southbridge, Mass., four pages, $8\frac{1}{2} \times 11$, 2-colors, explaining with numerous illustrations and text, the tricks in fitting and adjusting the different types of goggles.

PRECISION MILLING MACHINE

Hardinge Bros., Inc., Elmira, N. Y., four pages, $8\frac{1}{2} \times 11$, introducing the new BB5 precision milling machine for tool room and laboratory, showing the various attachments and giving a full mechanical description and specifications.

STANDARDIZED DRIVES

The Congress Tool & Die Corp., 9030 Lumpkin Ave., Detroit, Mich., four pages, $8\frac{1}{2} \times 11$, 2-colors, presenting the line of Congress pulleys, variable pitch pulleys, V step cone pulleys, flexible couplings and crown face pulleys, with specifications and data.

QUADRUPLE HEAD THREADING MACHINE

Landis Machine Co., Waynesboro, Pa. Four pages, $8\frac{1}{2} \times 11$, 2-color, illustrating the unit, explaining its accuracy, economy and production possibilities and showing details of the reverse taper head.

MACHINE TOOL DRIVES

Cullman Wheel Co., 1359 Altgeld St., Chicago—2 new 2 color broadsides, 17×20 and a new $8\frac{1}{2} \times 11$ 4 page bulletin on Cullman drives for lathes, shapers, milling machines, grinders, punch presses, etc. Also, two new 2 color bulletins, 4 pages, $8\frac{1}{2} \times 11$ giving data on Cullman sprockets and chain drives.

STRAIGHTENING MACHINES—AIR BLAST VALVES

F. J. Littell Machine Co., 4153 Ravenswood Ave., Chicago, Ill. Bulletin 3A—4 pages, $8\frac{1}{2} \times 11$, 2 colors, on Littell power-driven straightening machines. Bulletin 9A, 2 pages same size on the Littell air blast valve and nozzle, showing the construction of this equipment and method of using it.

DISC CLUTCHES

The Conway Clutch Co., 1541 Queen City Ave., Cincinnati, O. Catalog P-24, 16 pages and cover, $8\frac{1}{2} \times 11$, illustrating and describing many of the different types of Conway clutches for various industrial applications.

Buyers' Directory

Abrasive Compound

Timesaver Products Co., 33 S. Desplaines St., Chicago, Ill.

Abrasive Cut-off Machines

Challenge Mchy. Co., Grand Haven, Mich.
Tannewitz Works, Grand Rapids, Mich.

Angle Iron Cutting & Notching Machines

Ward Machinery Co., 564 W. Washington, Chicago, Ill.

Angle Plates, Adjustable

McMahon Co., Frank, Dayton, Ohio

Arbors

Kearney & Trecker Corp., Milwaukee, Wis.

Automatics

National Acme Co., Cleveland, Ohio

Balancing Ways

Anderson Bros. Mfg. Co., Rockford, Ill.
Sundstrand Machine Tool Co., Rockford, Ill.

Baling Presses

Galland-Henning Mfg. Co., Milwaukee, Wis.

Band Saw Machines, for Metal

Armstrong-Bilum Mfg. Co., 5741 Bloomington Ave., Chicago, Ill.

Delta Mfg. Co., Milwaukee, Wis.

Grob Bros., Grafton, Wis.

Oliver Machinery Co., Grand Rapids, Mich.

Tannewitz Works, Grand Rapids, Mich.

Wells Mfg. Co., Three Rivers, Mich.

Bar Cutters

Buffalo Forge Company, Buffalo, N. Y.

Belt Lacing

Armstrong-Bray & Co., 315 N. Loomis, Chicago

Belt Sanders

Skillsaw, Inc., 3304 Elston Ave., Chicago, Ill.

Belts, V-Type

Delta Mfg. Co., Milwaukee, Wis.

Bending Machines, Hand and Power

Armstrong-Bilum Mfg. Co., 5741 Bloomington Ave., Chicago, Ill.

Buffalo Forge Company, Buffalo, N. Y.

Lewthwaite Machine Co., 311 E. 47th St., New York, N. Y.

Pedrick Tool & Machine Co., Philadelphia, Pa.

Bending Rolls

Buffalo Forge Co., Buffalo, N. Y.

Marshalltown Mfg. Co., Marshalltown, Ia.

Ward Machinery Co., 564 W. Washington, Chicago, Ill.

Bins

Interior Steel Equipment Co., Cleveland, O.

Stackbin Corp., Providence, R. I.

Blower Wheels (Sirocco Type)

Janette Mfg. Co., 556 W. Monroe St., Chicago

Blowers, Portable Electric

Breuer Electric Mfg. Co., 5108 N. Ravenswood Ave., Chicago, Ill.

Buffalo Forge Company, Buffalo, N. Y.

Clements Mfg. Co., 6550 N. Argansett, Chicago

General Blower Co., 461 N. Peoria St., Chicago

Skillsaw, Inc., 3304 Elston Ave., Chicago, Ill.

Bolts and Nuts

Triplex Screw Co., Cleveland, Ohio

Books, Engineering and Technical

Lincoln Electric Co., Cleveland, Ohio

Starrett Co., L. S., Athol, Mass.

Boring Bars

Chicago Tool & Engineering Co., 84th & Clyde Ave., Chicago, Ill.

F. A. Maxwell Co., Bedford, Ohio

Rigid Tool Holder Co., Detroit, Mich.

Russell Boring Bar Co., Middletown, Ohio

Boring Heads

Flynn Manufacturing Co., Detroit, Mich.

Boring Machines

Ex-Cell-O Corp., Detroit, Mich.

R & L Tools, Philadelphia, Pa.

Brakes, Hand and Power

Dreis & Krump Mfg. Co., 7440 So. Loomis Blvd., Chicago, Ill.

Verson Allsteel Press Co., 9303 S. Kenwood Ave., Chicago, Ill.

Ward Machinery Co., 564 W. Washington, Chicago, Ill.

Brassers, Electric

Grob Brothers, Grafton, Wis.

Oliver Machinery Co., Grand Rapids, Mich.

Broaching Machine Tools

Colonial Broach Co., Detroit, Mich.

Broach Sharpening Machines

Colonial Broach Co., Detroit, Mich.

Broaches, Spline and Square

Colonial Bushings Co., Detroit, Mich.

Ex-Cell-O Corp., Detroit, Mich.

Taylor Machine Co., Cleveland, Ohio

Buffers, Bench

Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.

Vonnegut Moulder Corp., Indianapolis, Ind.

Buffers, Pedestal

Vonnegut Moulder Corp., Indianapolis, Ind.

Bushings, Jig

Acme Industrial Co., 210 N. Laffin St., Chicago

Colonial Bushings Co., Detroit, Mich.

Ex-Cell-O Corp., Detroit, Mich.

Bushings, Steel

Acme Industrial Co., 210 N. Laffin St., Chicago

Baumbach Mfg. Co., E. A., 1812 So. Kilbourne Ave., Chicago, Ill.

Cable, Welding

Lincoln Electric Co., Cleveland, Ohio

Calipers

Conet Tools, Inc., 39 Union Square, New York

Scherr Co., George, 122 Lafayette St., N. York

Cams, Alloy Steel

Modern Collet & Machine Co., Ecorse, Mich.

Cap Screws

Triplex Screw Co., Cleveland, Ohio

Center Points

Ford Motor Co., Johanson Div., Dearborn, Mich.

Centering Machines

Cullman Wheel Co., 1359 Altgeld St., Chicago

Sundstrand Machine Tool Co., Rockford, Ill.

Centers, Lathe

Modern Machine Corp., Brooklyn, N. Y.

Motor Tool Mfg. Co., Detroit, Mich.

Rigid Tool Holder Co., Detroit, Mich.

Sturdimatic Tool Co., Detroit, Mich.

Chains, Silent and Roller

Cullman Wheel Co., 1359 Altgeld St., Chicago

Chamfering Machines, Automatic

Grant Mfg. & Machine Co., Bridgeport, Conn.

Chaser Grinders

National Acme Co., Cleveland, Ohio

Chucking Fingers

Modern Collet & Machine Co., Ecorse, Mich.

Morrison Machine Products Div., Elmira, N. Y.

Buyers' Directory

Chucking Machines

National Acme Co., Cleveland, Ohio

Chucks, AirHannifin Mfg. Co., 621 S. Kolmar Ave., Chgo.
Tomkins-Johnson Co., Jackson, Mich.**Chucks, Automatic**

Procunier Safety Chuck Co., 14 S. Clinton St., Chicago, Ill.

Chucks, ColletHardinge Brothers, Inc., Elmira, N. Y.
Procunier Safety Chuck Co., 14 S. Clinton St., Chicago, Ill.**Chucks, Drill and Tap**

Chicago Tool & Engineering Co., 84th & Clyde Ave., Chicago, Ill.

Errington Mech. Labor., Staten Island, N. Y.
Etco Tool Co., 594 Johnson Ave., Brooklyn, N. Y.
Hartford Special Mach'y Co., Hartford, Conn.
Procunier Safety Chuck Co., 14 S. Clinton St., Chicago, Ill.**Chucks, Lathe**

L-W Chuck Co., Toledo, Ohio

Chucks, Magnetic

Brown & Sharpe Mfg. Co., Providence, R. I.

Chucks, Quick Change

Procunier Safety Chuck Co., 14 So. Clinton St., Chicago, Ill.

Clamping Devices, Air Operated

Hannifin Mfg. Co., 621 S. Kolmar Ave., Chgo.

Clutches, Friction

Conway Clutch Co., Cincinnati, Ohio

Collets and Feed Fingers

Morrison Machine Products Div., Elmira, N. Y.

Collets for all Lathes and MillersHardinge Brothers, Inc., Elmira, N. Y.
Modern Collet & Machine Co., Ecorse, Mich.
Sutton Tool Co., Detroit, Mich.**Collet Tubes**Modern Collet & Machine Co., Ecorse, Mich.
Sutton Tool Co., Detroit, Mich.**Comparators**

Federal Products Corp., Providence, R. I.

Contract Work Wanted

Burke Machine Tool Co., Conneaut, Ohio

Counterbores

Ex-Cell-O Corp., Detroit, Mich.

Countersinks

Severance Tool Mfg. Co., Saginaw, Mich.

Couplings, Belt

Armstrong-Bray & Co., 315 N. Loomis, Chicago

Couplings, Compression Shaft

W. H. Nicholson & Co., Wilkes-Barre, Pa.

Couplings, FlexibleCongress Tool & Die Co., Detroit, Mich.
Lovejoy Flex. Coupling Co., 5026 Lake, Chicago
W. H. Nicholson & Co., Wilkes-Barre, Pa.**Couplings, Friction Clutch**

Conway Clutch Co., Cincinnati, Ohio

Couplings, Shaft

W. H. Nicholson & Co., Wilkes-Barre, Pa.

Cut-Off Machines

Modern Machine Tool Co., Jackson, Mich.

Cut-off SawsOliver Machinery Co., Grand Rapids, Mich.
Tannewitz Works, Grand Rapids, Mich.**Cutler Grinders**Gorton Machine Co., Geo., Racine, Wis.
Oliver Instrument Co., Adrian, Mich.**Cutters**Progressive Tool & Cutter Co., Ferndale, Mich.
Putnam Tool Co., Detroit, Mich.
Tomkins-Johnson Co., Jackson, Mich.**Cutters, Ball Socket**

Severance Tool Mfg. Co., Saginaw, Mich.

Cutters, Midget Milling

Severance Tool Mfg. Co., Saginaw, Mich.

Cutters, MillingBrown & Sharpe Mfg. Co., Providence, R. I.
Ex-Cell-O Corp., Detroit, Mich.
Machinists Tool Grinding Co., 2834 W. Lake St., Chicago, Ill.
Modern Machine Tool Co., Jackson, Mich.
Renu Tool Company, Detroit, Mich.
Willey's Carbide Tool Co., Detroit, Mich.**Cutters, Gear**

Michigan Tool Co., Detroit, Mich.

Cutters, Taper Reaming

Severance Tool Mfg. Co., Saginaw, Mich.

Cutters, Tube Burring

Severance Tool Mfg. Co., Saginaw, Mich.

Cylinders, AirHanna Engineering Works, 1763 Elston, Chicago
Hannifin Mfg. Co., 621 S. Kolmar, Chicago
Tomkins-Johnson Co., Jackson, Mich.**Demagnetizers**

Electro-Matic Products Co., 4826 Deming Place, Chicago, Ill.

Luma Electric Equipment Co., Toledo, Ohio

L-W Chuck Co., Toledo, Ohio

Printz Electric Co., Detroit, Mich.

Victor Machinery Co., 130 S. Clinton St., Chicago, Ill.

Die Casting Machines

Madison-Kipp Corporation, Madison, Wis.

Die Castings

Congress Tool & Die Co., Detroit, Mich.

Die Cushions

Dayton Rogers Mfg. Co., Minneapolis, Minn.

Die Duplicating MachinesGorton Machine Co., Geo., Racine, Wis.
Madison-Kipp Corporation, Madison, Wis.**Die Filers**Continental Machine Specialties, Minneapolis
Grob Brothers, Grafton, Wis.
Jarvis Co., Charles L., Middletown, Conn.
Oliver Instrument Co., Adrian, Mich.**Die Making Machines**Armco Co., Milwaukee, Wis.
Continental Machine Specialties, Minneapolis
Grob Brothers, Grafton, Wis.
Harvey Mfg. Co., 161 Grand St., New York
Oliver Instrument Co., Adrian, Mich.
Oliver Machinery Co., Grand Rapids, Mich.
Pratt & Whitney, Hartford, Conn.**Die Makers' Supplies**Cerro de Pasco Copper Corp., 44 Wall St., New York, N. Y.
Dayton Rogers Mfg. Co., Minneapolis, Minn.**Die Sets**

Baumbach Mfg. Co., E. A., 1812 So. Kilbourn Ave Chicago, Ill.

Buyers' Directory

Dies, Automatic Self-Opening
National Acme Company, Cleveland, Ohio

Dies, Blank and Forming
American Tool Works, Inc., Hartford, Conn.
Hamilton Tool Company, Hamilton, Ohio
Hovis Screwlock Co., Detroit, Mich.

Dies, Hole Punching
Strippit Corp., Buffalo, N. Y.

Dies, Notching
Strippit Corp., Buffalo, N. Y.

Dies, Punch Press
Wrought Washer Mfg. Co., Milwaukee, Wis.

Dividing Heads
Wm. Carroll & Son, Norwood, Cincinnati, O.
L-W Chuck Co., Toledo, Ohio

Dowel Pins, Steel
Acme Industrial Co., 210 N. Laflin St., Chicago
Baumbach Mfg. Co., E. A., 1812 So. Kilbourne Ave., Chicago, Ill.

Draftsmen's Tables
Hamilton Mfg. Co., Two Rivers, Wis.

Dressing Tools
Willey's Carbide Tool Co., Detroit, Mich.

Drill Bushings
Acme Industrial Co., 210 N. Laflin St., Chicago
Universal Eng. Corp., Frankenmuth, Mich.

Drills, Electric
Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.
Skillsaw, Inc., 3304 Elston Ave., Chicago, Ill.
Stanley Electric Tool Div., New Britain, Conn.

Drill Grinders
Black Diamond Saw & Machine Works, Inc.,
Natick, Mass.
Gallmeyer & Livingston Co., Grand Rapids, Mich.
Oliver Instrument Co., Adrian, Mich.

Drilling Machines, Bench
Atlas Press Co., Kalamazoo, Mich.
Ayer Mfg. Co., Chicago Heights, Ill.
Buffalo Forge Company, Buffalo, N. Y.
Burke Machine Tool Co., Conneaut, Ohio
Delta Mfg. Co., Milwaukee, Wis.

Drilling Machines, Multiple Spindle
Buffalo Forge Co., Buffalo, N. Y.
Candy-Otto Mfg. Co., Chicago Heights, Ill.

Drilling Machines, Portable Electric
Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.
Skillsaw, Inc., 3304 Elston Ave., Chicago, Ill.
Strand Co., N. A., 5001 N. Wolcott St., Chicago

Drilling Machines, Post
Buffalo Forge Co., Buffalo, N. Y.

Drilling Machines, Sensitive
Atlas Press Co., Kalamazoo, Mich.
Ayer Mfg. Co., Chicago Heights, Ill.
Buffalo Forge Company, Buffalo, N. Y.
Burke Machine Tool Co., Conneaut, Ohio
Hamilton Tool Co., Hamilton, Ohio

Drilling Machines, Wall Type
Ayer Mfg. Co., Chicago Heights, Ill.

Drilling Machines, Vertical
Atlas Press Co., Kalamazoo, Mich.
Buffalo Forge Company, Buffalo, N. Y.

Drives, Lathe
Berkeley Engineering Co., Cleveland, Ohio
Cullman Wheel Co., 1359 Algeld St., Chicago
Hardinge Brothers, Inc., Elmira, N. Y.
Powermaster, 25 E. Fourth St., New York, N. Y.
Remco Products Corp., 110 S. Dearborn St., Chicago, Ill.

Elevating Tables
Hamilton Tool Company, Hamilton, Ohio

Emery Wheel Dressers and Cutters
Western Tool & Mfg. Co., Springfield, Ohio

End Mills
Progressive Tool & Cutter Co., Ferndale, Mich.
Putnam Tool Co., Detroit, Mich.
Renu Tool Co., Detroit, Mich.
Willey's Carbide Tool Co., Detroit, Mich.

Engraving Machines
Gorton Machine Co., Geo., Racine, Wis.

Etching Machines, Electric
Brewster Co., Inc., 50 Church St., New York, N. Y.

Luma Electric Equipment Co., Toledo, Ohio
Printz Electric Co., Detroit, Mich.

Exhaust Blowers
Buffalo Forge Company, Buffalo, N. Y.

Expansion Plugs
Wrought Washer Mfg. Co., Milwaukee, Wis.

Experimental Work
American Tool Works, Inc., Hartford, Conn.

Extractors, Tap
Walton Co., Hartford, Conn.

Feed Fingers for Auto. Screw Machines
Modern Collet & Machine Co., Ecorse, Mich.
Morrison Machine Products Div., Elmira, N. Y.
Sutton Tool Co., Detroit, Mich.

Files
Oliver Instrument Co., Adrian, Mich.

Files, Rotary
Ford Mfg. Co., M. A., Davenport, Iowa
Grobet File Corp. of America, 3 Park Place,
New York, N. Y.

Hamilton Tool Co., Hamilton, Ohio
Jarvis Co., Charles L., Middletown, Conn.
Pratt & Whitney Div., Hartford, Conn.
Severance Tool Mfg. Co., Saginaw, Mich.

Filing Machines
Continental Machine Specialties, Minneapolis
Crob Brothers, Grafton, Wis.
Harvey Mfg. Co., 161 Grand St., New York
Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.
Oliver Instrument Co., Adrian, Mich.

Filing Room Equipment
Wardwell Manufacturing Co., Cleveland, Ohio

Flangers, Hand and Power
Ward Machinery Co., 564 W. Washington, Chicago, Ill.

Flexible Couplings
Lovejoy Flexible Coupling Co., 5026 Lake, Chgo.

Flexible Shafts and Accessories
American Rotary Tools Co., 44 Whitehall St.,
New York, N. Y.

Haskins Co., R. G., 4654 W. Fulton, Chicago
Jarvis Co., Charles L., Middletown, Conn.
Mall Tool Co., 7742 S. Chicago Ave., Chicago
Strand & Co., 5001 N. Wolcott, Chicago
Wyzenbeck & Staff, Inc., 838 W. Hubbard, Chgo.

Flexible Shaft Couplings
Lovejoy Flexible Coupling Co., 5026 Lake, Chgo.
W. H. Nicholson & Co., Wilkes-Barre, Pa.

Flexible Shaft Machinery
Haskins Co., R. G., 4654 W. Fulton, Chicago
Jarvis Co., Charles L., Middletown, Conn.
Mall Tool Co., 7742 S. Chicago Ave., Chicago
Pratt & Whitney, Hartford, Conn.
Strand & Co., 5001 N. Wolcott, Chicago
Wyzenbeck & Staff, Inc., 838 W. Hubbard, Chgo.

Flue Lathes
Marshalltown Mfg. Co., Marshalltown, Ia.

Flue Welders
Marshalltown Mfg. Co., Marshalltown, Ia.

Buyers' Directory

Forming Tools

Michigan Tool Co., Detroit, Mich.
Morrison Machine Products Div., Elmira, N. Y.

Furniture, Machine Shop

Western Tool & Mfg. Co., Springfield, Ohio

Gages

Federal Products Corp., Providence, R. I.
Ford Motor Co., Johansson Div., Dearborn, Mich.
Willey's Carbide Tool Co., Detroit, Mich.

Gages, Pin, Plug, Ring and Snap

American Tool Works, Inc., Hartford, Conn.
Standard Gage Co., Poughkeepsie, N. Y.

Gages, Pressure

Marshalltown Mfg. Co., Marshalltown, Ia.

Gages, Special

Federal Products Corp., Providence, R. I.
Ford Motor Co., Johansson Div., Dearborn, Mich.
Standard Gage Co., Poughkeepsie, N. Y.
Starrett Co., L. S., Athol, Mass.

Gages, Taper

Hartford Special Machinery Co., Hartford, Conn.

Gage Blocks, Precision

Ford Motor Co., Johansson Div., Dearborn, Mich.

Gasoline Electric Light Plants

Janette Mfg. Co., 556 W. Monroe St., Chicago

Gears

Abart Gear & Mch. Co., 4832 W. 16th St., Chgo.
Atlantic Gear Works, 200 Lafayette St., New York, N. Y.
Taylor Machine Co., Cleveland, Ohio

Generators

Chicago Electric Co., 1330 W. Cermak Rd., Chgo.
Janette Mfg. Co., 552 W. Monroe St., Chicago

Goggles

Sellstrom Mfg. Co., 646 N. Aberdeen St., Chicago, Ill.

Grinder Live Centers

Motor Tool Mfg. Co., Detroit, Mich.

Grinders, Air

M-B Products, Detroit, Mich.
Madison-Kipp Corporation, Madison, Wis.

Grinders, Bench

Baldor Electric Co., St. Louis, Mo.
Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.
Stanley Electric Tool Div., New Britain, Conn.
Vonnegut Moulder Corp., Indianapolis, Ind.

Grinders, Disc

Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.
Oliver Machinery Co., Grand Rapids, Mich.
Wyzenbeck & Staff, Inc., 838 W. Hubbard, Chgo.

Grinders, External

F. A. Maxwell Co., Bedford, Ohio

Grinders, Flexible Shaft

Haskins Co., R. G., 4654 Fulton St., Chicago
Jarvis Co., Charles L., Middletown, Conn.
Mall Tool Co., 7742 S. Chicago Ave., Chicago
Stanley Electric Tool Div., New Britain, Conn.
N. A. Strand & Co., 5001 N. Wolcott, Chicago

Grinders, Hand

Chicago Wheel & Mfg. Co., 1101 W. Monroe St., Chicago, Ill.
Dremel Mfg. Co., Racine, Wis.
Duro Metal Products Co., 2651 N. Kildare Ave., Chicago, Ill.
Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.
M-B Products Co., Detroit, Mich.
Skilsaw, Inc., 3304 Elston Ave., Chicago, Ill.

Grinders, Heavy Duty

Vonnegut Moulder Corp., Indianapolis, Ind.

Grinders, High Speed

Bridgeport Pattern & Model Works, Bridgeport, Conn.
Chicago Wheel & Mfg. Co., 1101 W. Monroe St., Chicago, Ill.
Dremel Mfg. Co., Racine, Wis.
Jarvis Co., Charles L., Middletown, Conn.
Mall Tool Co., 7742 S. Chicago Ave., Chicago
M-B Products, Detroit, Mich.

Grinders, Internal

Chicago Tool & Engineering Co., 84th & Clyde Ave., Chicago, Ill.
F. A. Maxwell Co., Bedford, Ohio

Grinders, Pedestal Electric

Baldor Electric Co., St. Louis, Mo.

Grinders, Swing Frame

Vonnegut Moulder Corp., Indianapolis, Ind.

Grinders, Valve

F. A. Maxwell Co., Bedford, Ohio

Grinders and Polishers, Belt

Oliver Machinery Co., Grand Rapids, Mich.

Grinding Attachments, Drill

Atlas Press Co., Kalamazoo, Mich.
Carlson Mfg. Co., C. H., Minneapolis, Minn.
Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.
Oliver Instrument Co., Adrian, Mich.

Grinding, Centerless (Contract)

Ertel Machine Co., Indianapolis, Ind.
Machinists Tool Grinding Co., 2834 W. Lake St., Chicago, Ill.

Grinding Compound

Timesaver Products Co., 33 S. Desplaines St., Chicago, Ill.

Grinding Machines, Belt

Armiglo Co., Milwaukee, Wis.
Walls Sales Corp., 96 Warren St., New York

Grinding Machines, Cutter, Reamer and Tool

Brown & Sharpe Mfg. Co., Providence, R. I.
Gallmeyer & Livingston Co., Grand Rapids, Mich.

National Machine Tool Co., Racine, Wis.

Oliver Instrument Co., Adrian, Mich.

Prosser & Son, 120 Wall St., New York, N. Y.

Rogers & Co., Buffalo, N. Y.

Grinding Machines, Internal

National Machine Tool Co., Racine, Wis.

Grinding Machines, Portable Electric

Chicago Tool & Engineering Co., 84th & Clyde Ave., Chicago, Ill.

Chicago Wheel & Mfg. Co., 1101 W. Monroe St., Chicago, Ill.

Dremel Mfg. Co., Racine, Wis.

Duro Metal Products Co., 2651 N. Kildare Ave., Chicago, Ill.

Haskins Co., R. G., 4654 W. Fulton, Chicago

Jarvis Co., Charles L., Middletown, Conn.

Mall Tool Co., 7742 S. Chicago Ave., Chicago

National Machine Tool Co., Racine, Wis.

Pratt & Whitney, Hartford, Conn.

Strand Co., N. A., 5001 N. Wolcott St., Chicago

Grinding Machines, Surface

Gallmeyer & Livingston Co., Grand Rapids, Mich.

Grinding Machines, Tap

Gallmeyer & Livingston Co., Grand Rapids, Mich.
Oliver Instrument Co., Adrian, Mich.

Grinding Machines, Tool

Prosser & Son, 120 Wall St., New York, N. Y.
Rogers & Co., Buffalo, N. Y.

Grinding Machines, Universal

Brown & Sharpe Mfg. Co., Providence, R. I.

Buyers' Directory

Grinding Service

Machinists Tool Grinding Co., 2834 W. Lake St., Chicago, Ill.

Grinding Spindles

Ex-Cell-O Corp., Detroit, Mich.

Grinding Wheels

Chicago Wheel & Mfg. Co., 1101 W. Monroe St., Chicago, Ill.

Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.

Hack Saw Blades

Armstrong-Blum Mfg. Co., 5741 Bloomingdale Ave., Chicago, Ill.

Starrett Co., L. S., Athol, Mass.

Hack Saw Machines

Armstrong-Blum Mfg. Co., 5741 Bloomingdale Ave., Chicago, Ill.

L-W Chuck Co., Toledo, Ohio

Wells Mfg. Corp., Three Rivers, Mich.

Hammers, Portable Electric

Stanley Electric Tool Div., New Britain, Conn.

Hammers, Soft Faced

Greene Tweed & Co., 109 Duane St., New York

Skilaw, Inc., 3304 Elston Ave., Chicago, Ill.

Hand Saw Machine Live Centers

Motor Tool Mfg. Co., Detroit, Mich.

Hand Screw Machines, Precision

Hardinge Brothers, Inc., Elmira, N. Y.

Heads, Boring

Flynn Manufacturing Co., Detroit, Mich.

Hobs

Michigan Tool Co., Detroit, Mich.

Hole Cutters

Wyzenbeek & Staff, Inc., 828 W. Hubbard, Chgo.

Index Centers

Brown & Sharpe Mfg. Co., Providence, R. I.

Wm. Carroll & Son, Norwood, Cincinnati, Ohio

L-W Chuck Co., Toledo, Ohio

Index Fixtures

Tree Tool & Die Works, Racine, Wis.

Indicators, Dial

Federal Products Corp., Providence, R. I.

Standard Gage Co., Inc., Poughkeepsie, N. Y.

Starrett Co., L. S., Athol, Mass.

Indicators, Speed

Greene Tweed & Co., 109 Duane St., New York

Starrett Co., L. S., Athol, Mass.

Indicators, Surface Test

Federal Products Corp., Providence, R. I.

Reich Mfg. Co., J. R., Dayton, Ohio

Starrett Co., L. S., Athol, Mass.

Jigs and Fixtures

American Tool Works, Inc., Hartford, Conn.

Hamilton Tool Company, Hamilton, Ohio

Hartford Special Machinery Co., Hartford, Conn.

Keyseating Machines

Burr & Son, John T., Brooklyn, N. Y.

Knife Grinders

Rogers & Co., Buffalo, N. Y.

Lapping Compound

Timesaver Products Co., 33 S. Desplaines St., Chicago, Ill.

Lathe Live Centers

Modern Machine Corp., Brooklyn, N. Y.

Motor Tool Mfg. Co., Detroit, Mich.

Rigid Tool Holder Co., Detroit, Mich.

Sturdimatic Tool Co., Detroit, Mich.

Lathe Drives

Cullman Wheel Co., 1359 Altgeld St., Chicago

Hardinge Brothers, Inc., Elmira, N. Y.

Lathes, Back Geared

Atlas Press Co., Kalamazoo, Mich.
Rivett Lathe & Grinder, Inc., Brighton, Boston
South Bend Lathe Works, South Bend, Ind.

Lathes, Bench

Atlas Press Co., Kalamazoo, Mich.
Delta Mfg. Co., Milwaukee, Wis.
Hardinge Brothers, Inc., Elmira, N. Y.
Rivett Lathe & Grinder, Inc., Brighton, Boston
Sheldon Machine Co., 3257 Cottage Grove Ave., Chicago, Ill.
South Bend Lathe Works, South Bend, Ind.

Lathes, Brake Drum

South Bend Lathe Works, South Bend, Ind.

Lathes, Engine

South Bend Lathe Works, South Bend, Ind.

Lathes, Manufacturing

Sundstrand Machine Tool Co., Rockford, Ill.

Lathes, Screw Cutting

Atlas Press Co., Kalamazoo, Mich.
Hardinge Brothers, Inc., Elmira, N. Y.
South Bend Lathe Works, South Bend, Ind.

Lathes, Speed

Schauer Machine Co., Cincinnati, Ohio

Lathes, Toolroom

Atlas Press Co., Kalamazoo, Mich.
Hardinge Brothers, Inc., Elmira, N. Y.
South Bend Lathe Works, South Bend, Ind.

Layout Fluid

Dayton Rogers Mfg. Co., Minneapolis, Minn.
Michigan Chrome Company, Detroit, Mich.

Layout Plates

Busch Co., J. C., Milwaukee, Wis.
Challenge Machinery Co., Grand Haven, Mich.

Leader Pins, Steel

Acme Industrial Co., 210 Laflin St., Chicago, Ill.

Leather Oil Retainers

Gits Bros. Mfg. Co., 1860 S. Kilbourn, Chicago

Lift Jacks

All Steel Welded Truck Corp., Rockford, Ill.

Live Lathe Centers

Modern Machine Corp., Brooklyn, N. Y.
Motor Tool Mfg. Co., Detroit, Mich.
Sturdimatic Tool Co., Detroit, Mich.

Live Skids

All Steel Welded Truck Corp., Rockford, Ill.

Lock Forming Machines, Power

Ward Machinery Co., 564 W. Washington, Chicago, Ill.

Lubricators, Air

Norgren, C. A., Denver, Colorado

Lubricators, Automatic

Gits Bros. Mfg. Co., 1860 S. Kilbourn, Chicago
Greene Tweed & Co., 109 Duane St., New York
Madison-Kipp Corporation, Madison, Wis.
M-B Products Co., Detroit, Mich.
Norgren Co., C. A., Denver, Colorado

Lubricators, Engine

Madison-Kipp Corporation, Madison, Wis.

Magnetic Chuck Demagnetizers

Electro-Matic Products Co., 4820 Deming Place, Chicago, Ill.

Mandrels, Expanding

W. H. Nicholson & Co., Wilkes-Barre, Pa.
Western Tool & Mfg. Co., Springfield, Ohio

Marking Machines

Schmidt, Geo. T., Inc., 1802 Belle Plaine Ave., Chicago, Ill.

Buyers' Directory

Milling Attachments

Bridgeport Pattern & Model Works, Bridgeport, Conn.
Brown & Sharpe Mfg. Co., Providence, R. I.
Burke Machine Tool Co., Conneaut, Ohio
Wm. Carroll & Son, Norwood, Cincinnati, Ohio
Kearney & Trecker Corp., Milwaukee, Wis.

Milling Machine Live Centers

Motor Tool Mfg. Co., Detroit, Mich.

Milling Machines, Bench

Burke Machine Tool Co., Conneaut, Ohio
Hardinge Brothers, Inc., Elmira, N. Y.
Sundstrand Machine Tool Co., Rockford, Ill.

Milling Machines, Hand

Burke Machine Tool Co., Conneaut, Ohio
Sundstrand Machine Tool Co., Rockford, Ill.

Milling Machines, Plain

Brown & Sharpe Mfg. Co., Providence, R. I.
Burke Machine Tool Co., Conneaut, Ohio
Kearney & Trecker Corp., Milwaukee, Wis.
Sundstrand Machine Tool Co., Rockford, Ill.

Milling Machines, Universal

Brown & Sharpe Mfg. Co., Providence, R. I.
Gorton Machine Co., Geo., Racine, Wis.
Kearney & Trecker Corp., Milwaukee, Wis.

Milling Machines, Vertical

Blank Machinery, Jackson, Mich.
Gorton Machine Co., Geo., Racine, Wis.
Kearney & Trecker Corp., Milwaukee, Wis.

Motors

Chicago Electric Co., 1330 W. Cermak Rd., Chgo.
Janette Mfg. Co., 552 W. Monroe St., Chicago

Motor-Generator Sets

Chicago Electric Co., 1330 W. Cermak Rd., Chgo.
Dremel Mfg. Co., Racine, Wis.
Janette Mfg. Co., 552 W. Monroe St., Chicago

Motor Drives, Universal

Berkeley Engineering Co., Cleveland, Ohio
Cullman Wheel Co., 1359 Altgeld St., Chicago
Powermaster, 25 E. Fourth St., New York, N. Y.
Remco Products Corp., 110 S. Dearborn St., Chicago, Ill.

Steege Machinery Co., 548 W. Monroe St., Chicago, Ill.

Turner Uni-Drive Co., Kansas City, Mo.

Motor Starters

Lincoln Electric Co., Cleveland, Ohio

Moulds & Lathes, Hammer and Vise

Johnson Tool Co., East Providence, R. I.

Multiple Rollers

Glits Bros. Mfg. Co., 1860 S. Kilbourn, Chicago

Nibbling Machines

National Machine Tool Co., Racine, Wis.

Oil Cups

Glits Bros. Mfg. Co., 1860 S. Kilbourn, Chicago

Oil Gauges

Glits Bros. Mfg. Co., 1860 S. Kilbourn, Chicago

Oil and Grease Seals

Glits Bros. Mfg. Co., 1860 S. Kilbourn, Chicago

Packings, Steam

Greene Tweed & Co., 109 Duane St., New York

Parallels

Ford Motor Co., Johansson Div., Dearborn, Mich.

Pins, Leader and Dowel

Acme Industrial Co., 210 Laflin St., Chicago, Ill.
Baumbach Mfg. Co., E. A., 1812 So. Kilbourn Ave., Chicago, Ill.

Pipe Cutters

Ridge Tool Co., Elyria, Ohio

Pipe Vises

Ridge Tool Co., Elyria, Ohio

Pipe Wrenches

Ridge Tool Co., Elyria, Ohio

Point Thinning Machines

Oliver Instrument Co., Adrian, Mich.

Press Brakes

Dreis & Krump Mfg. Co., 7440 Loomis Blvd., Chicago, Ill.

Verson Allsteel Press Co., 9303 S. Kenwood Ave., Chicago, Ill.

Ward Machinery Co., 564 W. Washington, Chicago, Ill.

Press Feeds

Littell Machine Co., F. J., 4153 Ravenswood Ave., Chicago, Ill.

Wittek Mfg. Co., 4300 W. 24th Place, Chicago

Presses, Arbor

Atlas Press Co., Kalamazoo, Mich.
Famco Machine Co., Racine, Wis.
Greenerd Arbor Press Co., Nashua, N. H.
Hanna Engineering Works, 1763 Elston, Chicago
Hannifin Mfg. Co., 621 S. Kolmar Ave., Chgo.
W. H. Nicholson & Co., Wilkes-Barre, Pa.
Sheldon Machine Co., 3257 Cottage Grove Ave., Chicago, Ill.
Tomkins-Johnson Co., Jackson, Mich.
Wilson, K. R., Buffalo, N. Y.

Presses, Bench

Atlas Press Co., Kalamazoo, Mich.
Greenerd Arbor Press Co., Nashua, N. H.

Presses, Broaching

Greenerd Arbor Press Co., Nashua, N. H.

Presses, Foot

Famco Machine Co., Racine, Wis.
Ward Machinery Co., 564 W. Washington, Chicago, Ill.

Presses, Forming

Marshalltown Mfg. Co., Marshalltown, Ia.

Presses, Hydraulic

Atlas Press Co., Kalamazoo, Mich.
Greenerd Arbor Press Co., Nashua, N. H.
Hannifin Mfg. Co., 621 S. Kolmar Ave., Chgo.

Presses, Inclined

Federal Press Co., Elkhart, Indiana.
Marshalltown Mfg. Co., Marshalltown, Ia.
Ross Co., David J., Benton Harbor, Mich.

Presses, Power

Dreis & Krump Mfg. Co., 7440 Loomis Blvd., Chicago, Ill.

Federal Press Co., Elkhart, Indiana
Verson Allsteel Press Co., 9303 S. Kenwood Ave., Chicago, Ill.

Presses, Punch

Dreis & Krump Mfg. Co., 7440 Loomis Blvd., Chicago, Ill.

Lewthwaite Machine Co., 311 E. 47th St., New York, N. Y.
Marshalltown Mfg. Co., Marshalltown, Ia.
Ross Co., David J., Benton Harbor, Mich.

Presses, Sheet Metal

Federal Press Co., Elkhart, Indiana

Presses, Steel

Verson Allsteel Press Co., 9303 S. Kenwood Ave., Chicago, Ill.

Buyers' Directory

Profiling Machines

Gorton Machine Co., Geo., Racine, Wis.
Oliver Instrument Co., Adrian, Mich.

Pulleys, Steel and Wood

Congress Tool & Die Co., Detroit, Mich.
Delta Mfg. Co., Milwaukee, Wis.

Pumps

Brown & Sharpe Mfg. Co., Providence, R. I.
Galland-Henning Mfg. Co., Milwaukee, Wis.

Pumps, Coolant

Ruthman Machinery Co., Cincinnati, Ohio
Tomkins-Johnson Co., Jackson, Mich.

Pumps, Lubricant

Ruthman Machinery Co., Cincinnati, Ohio

Punch, Shear and Bender, Hand

Armstrong-Blum Mfg. Co., 5741 Bloomingdale Ave., Chicago, Ill.
Buffalo Forge Co., Buffalo, N. Y.

Punch Press Guards

Ross Co., David J., Benton Harbor, Mich.

Punch Retainers

Hovis Screwlock Co., Detroit, Mich.

Punches and Dies

Hovis Screwlock Co., Detroit, Mich.
Lewthwaite Machine Co., 311 E. 47th St., New York, N. Y.

Punches, Hand

Armstrong-Blum Mfg. Co., 5741 Bloomingdale Ave., Chicago, Ill.
Buffalo Forge Company, Buffalo, N. Y.
Hovis Screwlock Co., Detroit, Mich.
Lewthwaite Machine Co., 311 E. 47th St., New York, N. Y.
Ward Machinery Co., 564 W. Washington, Chicago, Ill.
Whitney Metal Tool Co., Rockford, Ill.

Quick Change Collets & Chucks

Jarvis Co., Charles L., Middletown, Conn.

Racks, Bar Stock

Western Tool & Mfg. Co., Springfield, Ohio
Wm. S. Yohe Supply Co., Canton, Ohio

Reamers

Renu Tool Company, Detroit, Mich.

Rivets, Tubular and Split

Chicago Rivet & Machine Co., 1855 S. 54th St., Cicero, P. O. Chicago, Ill.

Riveters, Automatic Feed

Chicago Rivet & Machine Co., 1855 S. 54th St., Cicero, P. O. Chicago, Ill.
Tomkins-Johnson Co., Jackson, Mich.

Riveters, "Hy-Power" Hydraulic

Hannifin Mfg. Co., 621 S. Kolmar Ave., Chgo.

Riveters, Multiple Spindle

Grant Mfg. & Machine Co., Bridgeport, Conn.

Riveters, Pneumatic

Grant Mfg. & Machine Co., Bridgeport, Conn.
Hanna Engineering Works, 1763 Elston Ave., Chicago, Ill.
Hannifin Mfg. Co., 621 S. Kolmar Ave., Chgo.

Riveting Machines

Buffalo Forge Co., Buffalo, N. Y.
Grant Mfg. & Machine Co., Bridgeport, Conn.
Hanna Engineering Works, 1763 Elston Ave., Chicago, Ill.
Linley Bros. Co., Bridgeport, Conn.

Riveting Machines, Tubular and Split

Chicago Rivet & Machine Co., 1855 S. 54th St., Cicero, P. O. Chicago, Ill.

Rod Cutters

Armstrong-Blum Mfg. Co., 5741 Bloomingdale Ave., Chicago, Ill.
Lewthwaite Machine Co., 311 E. 47th St., New York, N. Y.

Rotary Converters

Janette Mfg. Co., 556 W. Monroe St., Chicago

Rotary Files

Ford Mfg. Co., M. A., Davenport, Iowa
Grobet File Corp. of America, 3 Park Place, New York, N. Y.
Hamilton Tool Co., Hamilton, Ohio
Jarvis Co., Charles L., Middletown, Conn.
Pratt & Whitney Div., Hartford, Conn.

Router Bits

American Rotary Tools Co., 44 Whitehall St., New York, N. Y.
Putnam Tool Co., Detroit, Mich.

Sanders

Jarvis Co., Charles L., Middletown, Conn.
Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.
Nedco Company, Waltham, Mass.
Stanley Electric Tool Div., New Britain, Conn.
Sterling Products Co., Detroit, Mich.

Saws

Black Diamond Saw & Machine Works, Inc., Natick, Mass.

Saws, Electric Hand

Delta Mfg. Co., Milwaukee, Wis.
Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.
Stanley Electric Tool Div., New Britain, Conn.

Saws, Rotary Hack

Stanley Electric Tool Div., New Britain, Conn.

Saw Sharpening Machines

Rogers & Co., Buffalo, N. Y.
Wardwell Manufacturing Co., Cleveland, Ohio

Sawing Machines

Continental Machine Specialties, Minneapolis
Delta Mfg. Co., Milwaukee, Wis.
Grob Brothers, Grafton, Wis.
Wells Mfg. Co., Three Rivers, Mich.

Scraping Machines, Hand & Pneumatic

Anderson Bros. Mfg. Co., Rockford, Ill.

Screw Drivers, Electric

Haskins Co., R. G., 4054 W. Fulton, Chicago
Jarvis Co., Charles L., Middletown, Conn.
Stanley Electric Tool Div., New Britain, Conn.

Screw Machine Parts

Modern Collet & Machine Co., Ecorse, Mich.
Sutton Tool Company, Detroit, Mich.

Buyers' Directory

Screw Machine Products

Economy Machine Products Co., 5207 Lawrence Ave., Chicago, Ill.
National Acme Company, Cleveland, Ohio
Wrought Washer Mfg. Co., Milwaukee, Wis.

Screw Machines, Automatic

Brown & Sharpe Mfg. Co., Providence, R. I.
National Acme Company, Cleveland, Ohio

Scribers

Ford Motor Co., Johansson Div., Dearborn, Mich.
Starrett Co., L. S., Athol, Mass.

Set Screws, Headless and Hollow

Economy Machine Products Co., 5207 Lawrence Ave., Chicago, Ill.
Safety Socket Screw Corp., 4440 N. Knox Ave., Chicago, Ill.
Triplex Screw Co., Cleveland, Ohio

Set-Up Appliances

Standard Shop Equipment Co., Inc., Phila., Pa.

Shafts, Flexible

R. G. Haskins Co., 4654 W. Fulton St., Chicago
Jarvis Co., Charles L., Middletown, Conn.
Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.
Pratt & Whitney, Hartford, Conn.
Strand Co., N. A., 5001 N. Wolcott St., Chicago

Shafts, Hangers & Boxes

Delta Mfg. Co., Milwaukee, Wis.

Shapers

Atlas Press Co., Kalamazoo, Mich.

Shaping Machines

Osborne & Sexton Machinery Co., Columbus, O.

Shears, Bevel

Marshalltown Mfg. Co., Marshalltown, Ia.
Ward Machinery Co., 564 W. Washington, Chicago, Ill.

Shears, Electric

Ward Machinery Co., 564 W. Washington, Chicago, Ill.

Shears, Hand

Armstrong-Blum Mfg. Co., 5741 Bloomingdale Ave., Chicago, Ill.
Beverly Shear Co., 3007 W. 110th Pl., Chicago
Lewthwaite Machine Co., 311 E. 47th St., New York, N. Y.
National Machine Tool Co., Racine, Wis.
Whitney Metal Tool Co., Rockford, Ill.

Shears, Power

Buffalo Forge Co., Buffalo, N. Y.
Dreks & Krump Mfg. Co., 7440 Loomis, Chicago
Stanley Electric Tool Div., New Britain, Conn.
Ward Machinery Co., 564 W. Washington, Chicago, Ill.

Shears, Slitting

Beverly Shear Co., 3007 W. 110th Pl., Chicago
Buffalo Forge Co., Buffalo, N. Y.
Dreks & Krump Mfg. Co., 7400 Loomis, Chicago
National Machine Tool Co., Racine, Wis.

Shears, Splitting

Marshalltown Mfg. Co., Marshalltown, Ia.

Shears, Throatless

Beverly Shear Co., 3007 W. 110th Pl., Chicago
Marshalltown Mfg. Co., Marshalltown, Ia.

Sheet Metal Working Machinery

Ward Machinery Co., 564 W. Washington, Chicago, Ill.

Shelving, Steel

Interior Steel Equipment Co., Cleveland, Ohio

Shop Lights

Vimco Mfg. Co., Buffalo, N. Y.

Sine Bars

Ford Motor Co., Johansson Div., Dearborn, Mich.

Socket Head Cap Screws

Economy Machine Products Co., 5207 Lawrence Ave., Chicago, Ill.
Safety Socket Screw Corp., 4440 N. Knox Ave., Chicago, Ill.

Special Tools and Machinery

American Tool Works, Inc., Hartford, Conn.

Speed Reducers

Abart Gear & Mch. Co., 4832 W. 16th St., Chgo.
Armiglo Co., Milwaukee, Wis.
Cullman Wheel Co., 1359 Altgeld St., Chicago
Janette Mfg. Co., 552 W. Monroe St., Chicago

Speed Saws, Universal

Wyzenbeck & Staff, Inc., 838 W. Hubbard, Chgo.

Spinning Lathes, Metal

Oliver Machinery Co., Grand Rapids, Mich.

Spools & Nuts for Auto. Screw Machines

Sutton Tool Co., Detroit, Mich.

Split Rivets

Chicago Rivet & Machine Co., 1855 S. 54th St., Cicero, P. O. Chicago, Ill.

Split Rivet Setters, Automatic Feed

Chicago Rivet & Machine Co., 1855 S. 54th St., Cicero, P. O. Chicago, Ill.

Spot Welding Machines, Speed

Armiglo Co., Milwaukee, Wis.
Eisler Engineering Co., Inc., Newark, N. J.
Interstate Machinery Co., Chicago, Ill.
Pier Equipment Mfg. Co., Benton Harbor, Mich.

Sprockets

Cullman Wheel Co., 1359 Altgeld St., Chicago

Stake Riveters

Marshalltown Mfg. Co., Marshalltown, Ia.

Stampings

Hamilton Tool Co., Hamilton, Ohio
Wrought Washer Mfg. Co., Milwaukee, Wis.

Steel Stamps

Colonial Bushings Co., Detroit, Mich.

Stop Watches

Meylan, A. R. & J. E., 266 W. 40th St., N.Y.C.

Storage Racks

Interior Steel Equipment Co., Cleveland, Ohio
Stackbin Corp., Providence, R. I.
Yohe Supply Co., Canton, Ohio

Straight Edges

Ford Motor Co., Johansson Div., Dearborn, Mich.

Straightening Machines

Whitney Metal Tool Co., Rockford, Ill.

Stripping Units

Strippit Corp., Buffalo, N. Y.

Studs, Milled

Safety Socket Screw Corp., 4440 N. Knox Ave., Chicago, Ill.

Tables, Drawing

Hamilton Mfg. Co., Two Rivers, Wis.

Tap Extractors

Walton Co., Hartford, Conn.

Buyers' Directory

Tap Holders

Proconier Safety Chuck Co., 14 S. Clinton St., Chicago, Ill.

Tapes, Steel

Starrett Co., L. S., Athol, Mass.

Tapping Machines and Attachments

Burke Machine Tool Co., Conneaut, Ohio
Errington Mechanical Laboratories, Staten Island, N. Y.
Etter Tool Co., 504 Johnson Ave., Brooklyn, N. Y.
Haskins Co., R. G., 4654 W. Fulton St., Chicago
Jarvis Co., Charles L., Middletown, Conn.
Proconier Safety Chuck Co., 14 So. Clinton St., Chicago, Ill.
Whitney Metal Tool Co., Rockford, Ill.

Taps, Collapsing

National Acme Company, Cleveland, Ohio

Thread Grinders

Ex-Cell-O Corp., Detroit, Mich.

Threading Machines, Automatic

Grant Mfg. & Machine Co., Bridgeport, Conn.

Threading Tools

Armstrong Bros. Tool Co., 308 N. Francisco Ave., Chicago, Ill.
Ridge Tool Co., Elyria, Ohio
Rivett Lathe & Grinder, Inc., Brighton, Boston

Timing Instruments

Meylan, A. R. & J. E., 266 W. 40th St., N. Y. C.

Tool Heads, Universal

Precision Tool Co., Bridgeport, Conn.

Tool Holders

Armstrong Bros. Tool Co., 308 N. Francisco Ave., Chicago, Ill.
Michigan Tool Co., Detroit, Mich.
Prosto Tool Mfg. Co., Detroit, Mich.
Rigid Tool Holder Co., Detroit, Mich.
Western Tool & Mfg. Co., Springfield, Ohio
Ziegler Tool Co., Detroit, Mich.

Tool Post Turrets

Colwell, S. G., Providence, R. I.

Tool Reclaiming

Machinists Tool Grinding Co., 2834 W. Lake St., Chicago, Ill.
Renu Tool Company, Detroit, Mich.

Tool Salvage

Renu Tool Company, Detroit, Mich.

Tools, Boring

Armstrong Bros. Tool Co., 308 N. Francisco Av., Chicago, Ill.
Comet Tools, Inc., 39 Union Square, New York

Tools, Lathe and Planer

Armstrong Bros. Tool Co., 308 N. Francisco Av., Chicago, Ill.

Tools, Machinists'

Armstrong Bros. Tool Co., 308 N. Francisco Av., Chicago, Ill.
Brown & Sharpe Mfg. Co., Providence, R. I.

Tram Points

Ford Motor Co., Johanson Div., Dearborn, Mich.

Transfer Punches

McMahon Co., Frank, Dayton, Ohio

Tube Flanging Machines

Grant Mfg. & Mche. Co., Bridgeport, Conn.

Tubular Rivet Setters, Automatic Feed

Chicago Rivet & Machine Co., 1855 S. 54th St., Cicero, P. O. Chicago, Ill.

Tungsten Carbide Tools

Metal Carbides Corp., Youngstown, Ohio
Michigan Tool Co., Detroit, Mich.
Willey's Carbide Tool Co., Detroit, Mich.

Turning Tools

R & L Tools, Philadelphia, Pa.

Universal Joints

American Tool Works, Inc., Hartford, Conn.

Used and Rebuilt Machinery

Aaron Machinery Co., 176 Lafayette St., N. Y.
Beal & Co., Joseph, Boston, Mass.
Belyea Co., Inc., 150 W. 18th St., New York
Bennet-Rafkin Machine Tool Corp., 30 Church St., New York, N. Y.
Bernstein & Co., Geo. M., 12 S. Clinton, Chgo.
Bieser Mfg. & Mch. Co., Springfield, Ill.
Broadway Machinery Co., Inc., 211 Centre St., New York, N. Y.
Brown Machinery Co., St. Louis, Mo.
Cincinnati Mach. & Supply Co., Cincinnati, O.
Clinton Machinery Co., 33 S. Clinton St., Chicago
DeWitt Tool Co., 173 Grand St., New York, N. Y.
Eastern Machinery Co., Cincinnati, Ohio
Emerman, Louis E. & Co., 1761 Elston, Chicago
Essley Machinery Co., E. L., 831 W. Evergreen Ave., Chicago, Ill.
Falk Mill Supply Co., Inc., Rochester, N. Y.
General Brierley Co., 401 N. Florida St., Chicago
General Machinery Corp., Boston, Mass.
Gilmore Machinery Co., 800 W. Lake St., Chicago, Ill.
Hackett Co., J. Lee, Detroit, Mich.
Hill, Clarke & Co., 645 W. Washington, Chgo.
Hyman & Sons, Joseph, Philadelphia, Pa.
Indianapolis Mch. & Supply Co., Indianapolis
Industrial Machinery Co., Indianapolis, Ind.
International Machinery Co., Detroit, Mich.
Interstate Machinery Co., 100 S. Clinton, Chgo.
Iroquois Machinery Co., Buffalo, N. Y.
Johnson & Sons Mch. Co., Wm. C., St. Louis
Jones Machine Tool Co., Cincinnati, Ohio
Klauber Machinery Co., St. Louis, Mo.
Lang Machinery Co., Pittsburgh, Pa.
McDonald Machinery Co., St. Louis, Mo.
Marr-Galbreath Mch. Co., Pittsburgh, Pa.
Midwest Equipment Co., 628 W. Lake, Chicago
Miles Machinery Co., 2025 Genesee Ave., Saginaw, Mich.
Modern Machinery Co., 243 Centre St., New York, N. Y.
Morcy Machinery Co., Inc., 410 Broome St., New York, N. Y.
Nelson Machinery Co., Green Bay, Wis.
Nema Electric Supply Co., 546 W. Lake St., Chicago, Ill.
Norton-Broadway Machinery Co., Cincinnati, O.
Nutmeg State Mch. Corp., New Haven, Conn.
O'Brien Machinery Co., Philadelphia, Pa.
Osborne & Sexton Machinery Co., Columbus, O.
Ott Machinery Sales Co., Detroit, Mich.
Passman Brothers, 705 W. Washington, Chicago, Ill.
Pruett Machinery Co., D. H., Cleveland, Ohio
Reliance Machinery Sales Co., Pittsburgh, Pa.
Reynolds Machinery, Providence, R. I.

Buyers' Directory

Used and Rebuilt Machinery—Cont.

Rosenkranz & Weisbecker, 2309-A Singer Bldg., New York City
 Royal Machinery Exchange, 401 Broome St., New York, N. Y.
 Scott-Banbach Mch. Co., 4007 W. 20th, Chgo.
 Segal Machinery Co., 117 S. Clinton St., Chicago
 Service Co., Cleveland, Ohio
 Albany, N. Y.
 Simmons Machine Tool Corp., Grand Rapids, Mich.
 Standard Machinery Co., Cleveland, O.
 Strong, Carlsle & Hammond Co., Cleveland, O.
 Superior Machinery Co., Albert City, Iowa
 Surplus Material & Machinery Co., Detroit, Mich.
 Surplus Stock & Mch. Co., Inc., 618 W. Lake St., Chicago, Ill.
 Travers Tool Co., 5 Court Square, Long Island City, N. Y.
 United Machinery & Supply Co., St. Louis, Mo.
 Victor Machinery Co., 130 S. Clinton, Chicago
 Victor Machinery Exchange, 251 Centre St., New York, N. Y.
 Vine, R. A., Detroit, Mich.
 Wertman Machinery Co., Cleveland, Ohio
 West Penn Machinery Co., Pittsburgh, Pa.
 White Mch. Co., A. D., 108 N. Jefferson, Chgo.
 Wigglesworth Machinery Co., Cambridge, Mass.

Vacuum Cleaners, Industrial

Breuer Electric Mfg. Co., 5108 N. Ravenswood Ave., Chicago, Ill.

Vacuum Cleaners, Portable

Breuer Electric Mfg. Co., 5108 N. Ravenswood Ave., Chicago, Ill.

Valves, Air

Air-Way Pump & Equipment Co., 617 W. Jackson, Chicago, Ill.
 Berkeley Engineering Co., Cleveland, Ohio
 Galland-Henning Mfg. Co., Milwaukee, Wis.
 Hanna Engineering Works, 1763 Elston, Chicago
 Hannifin Mfg. Co., 621 S. Kolmar Ave., Chicago
 Nicholson & Co., Wilkes-Barre, Penna.
 Ross Operating Valve Co., Detroit, Mich.
 Tomkins-Johnson Co., Jackson, Mich.

Valves

Berkeley Engineering Co., Cleveland, Ohio
 Galland-Henning Mfg. Co., Milwaukee, Wis.
 Hanna Engineering Works, 1763 Elston, Chicago
 Ross Operating Valve Co., Detroit, Mich.

Valves, Foot, Lever & Solenoid

Berkeley Engineering Co., Cleveland, Ohio
 Hanna Engineering Works, 1763 Elston, Chicago
 Hannifin Mfg. Co., 621 S. Kolmar Ave., Chicago
 Nicholson & Co., W. H., Wilkes-Barre, Pa.
 Ross Operating Valve Co., Detroit, Mich.

Valves, Hydraulic

Berkeley Engineering Co., Cleveland, Ohio
 Galland-Henning Mfg. Co., Milwaukee, Wis.
 Hanna Engineering Works, 1763 Elston, Chicago
 Hannifin Mfg. Co., 621 S. Kolmar Ave., Chicago
 Nicholson & Co., Wilkes-Barre, Penna.

Valves, Operating

Berkeley Engineering Co., Cleveland, Ohio
 Galland-Henning Mfg. Co., Milwaukee, Wis.
 Hanna Engineering Works, 1763 Elston, Chicago
 Hannifin Mfg. Co., 621 S. Kolmar Ave., Chicago
 Ross Operating Valve Co., Detroit, Mich.

Valves, Drilling Machine

Armstrong Blum Mfg. Co., 5741 Bloomingdale Ave., Chicago, Ill.
 Armstrong Bros. Tool Co., 308 N. Francisco Ave., Chicago, Ill.
 Chicago Tool & Engineering Co., 84th & Clyde Ave., Chicago, Ill.
 Johnson Tool Co., Inc., East Providence, R. I.
 L-W Chuck Co., Toledo, Ohio
 Modern Machine Tool Co., Jackson, Mich.

National Machine Tool Co., Racine, Wis.
 Odin Universal Corp., 110 S. Dearborn, Chicago
 Plunket Machine Co., 1823 W. Lake St., Chicago
 Sheldon Machine Co., 3257 Cottage Grove, Chgo.
 Yost Mfg. Co., Meadville, Pa.

Vises, Machinists'

L-W Chuck Co., Toledo, Ohio
 Miller & Crowningshield, Greenfield, Mass.
 Odin Universal Corp., 110 S. Dearborn, Chicago
 Sheldon Machine Co., 3257 Cottage Grove, Chgo.
 Western Tool & Mfg. Co., Springfield, Ohio
 Yost Mfg. Co., Meadville, Pa.

Vises, Milling Machine

Chicago Tool & Engineering Co., 84th & Clyde Ave., Chicago, Ill.
 Hartford Special Mch. Co., Hartford, Conn.
 L-W Chuck Co., Toledo, Ohio
 Miller & Crowningshield, Greenfield, Mass.
 Odin Universal Corp., 110 S. Dearborn, Chicago
 Plunket Machine Co., 1823 W. Lake St., Chicago
 Sheldon Machine Co., 3257 Cottage Grove, Chgo.
 Yost Mfg. Co., Meadville, Pa.

Vises, Precision

Odin Universal Corp., 110 S. Dearborn, Chicago

Vises, Shaper

L-W Chuck Co., Toledo, Ohio
 Odin Universal Corp., 110 S. Dearborn, Chicago
 Plunket Machine Co., 1823 W. Lake St., Chicago
 Sheldon Machine Co., 3257 Cottage Grove, Chgo.

Washers, All Types and Sizes

Wrought Washer Mfg. Co., Milwaukee, Wis.

Welders, Arc

Hobart Brothers, Troy, Ohio
 Lincoln Electric Co., Cleveland, Ohio
 Pier Equipment Mfg. Co., Benton Harbor, Mich.

Welders, Portable

Hobart Brothers, Troy, Ohio

Welding Accessories

Hobart Brothers, Troy, Ohio

Lincoln Electric Co., Cleveland, Ohio

Welding Electrodes and Holders

Hobart Brothers, Troy, Ohio
 Lincoln Electric Co., Cleveland, Ohio

Welding Generators, Arc

Hobart Brothers, Troy, Ohio
 Lincoln Electric Co., Cleveland, Ohio

Welding Machines, Electric Spot

Armco Co., Milwaukee, Wis.
 Elsler Engineering Co., Inc., Newark, N. J.
 Interstate Machinery Co., Chicago, Ill.
 Pier Equipment Mfg. Co., Benton Harbor, Mich.
 Ward Machinery Co., 564 W. Washington, Chicago, Ill.

Welding Machines and Equipment, E. I. Arc

Hobart Brothers, Troy, Ohio
 Lincoln Electric Co., Cleveland, Ohio
 Pier Equipment Mfg. Co., Benton Harbor, Mich.

Welding Machines, Resistance

Armco Co., Milwaukee, Wis.
 Elsler Engineering Co., Inc., Newark, N. J.
 Lincoln Electric Co., Cleveland, Ohio
 Pier Equipment Mfg. Co., Benton Harbor, Mich.

Woodworking Machinery

Tannewitz Works, Grand Rapids, Mich.

Worm Drives

Michigan Tool Co., Detroit, Mich.

Wrenches, Reversible

Greene Tread & Co., 109 Duane St., New York

Used and Rebuilt Machinery

Classified Section

Lists of Used and Rebuilt Machinery, either For Sale, Wanted, or For Exchange, set in uniform style, will be published in the Classified Section at the rate of \$5.00 for your name and address and a five line advertisement. For additional lines, 40c per line.

Write directly to those offering the machine for sale, for prices and full descriptions. If what you seek is not advertised, write Hitchcock Publishing Company, Chicago, making known your wants on either new or used machinery and the publisher will gladly pass them along to the advertisers.

FOR SALE BY

Goldscher Machinery Co.

817 W. Lake St., Chicago, Ill.

Forming rolls, George Whiting, 62" between housings, lower roll 5", top roll 6", drop end, 10-gauge cap. Double loose and tight pulley. Arranged for mtr. dr. Miller, No. 2 Kempsmith plain with vertical head. Press, gang, Niagara No. 6, back geared, 14" stroke, 36" between housings. Press, coining, No. 2 Waterbury-Farrel, back geared, double action, 1" stroke, 12x11 1/2 between housings, with automatic roller feed. Punch press, No. 64 Consolidated. Solid back, 1 1/2" stroke, 15" die space. Punch presses, No. 3 Long & Alstatter o. b. l., 30 ton, 2 1/2" stroke, 6 1/2" die space (2). Tapper, No. 1 Garvin automatic.

FOR SALE BY

Aaron Machinery Co.,

176 Lafayette St., New York, N. Y.

Brake, D. & K. power 8'x10 gage \$625
Drill, 3 spindle Henry & Wright, m. d., like new... 375
Drill, 4 spindle Allen b b 385
Drill, 4 spindle Leland-Gifford b b 395
Engraving machines, Decker-Gorton
Grinder, Pratt & Whitney 14" vertical 475
Grinder, Abrasive No. 3, excellent 785
Hoists, 2 ton Sprague electric, 3 phase, 60 cycle... 175
Lathe, 20" x10" American 3 step cone, No. 53395... 875
Miller, Becker No. 2, No. 24 vert. millers, rot. table. Miller, Cincinnati No. 2 vert., high power 895
Miller, Fox No. 3, complete, like new 145
Power shear, 8'x14 gauge Bertich 12" gap 675
Presses, hydraulic, steam plates, pumps
Punch and shear, Buffalo No. 4 combination, m. d. 775
Shaper, Davis s. p. d., like new 395
Shears, 8' Pexto foot power 195
Lathes, drill, power presses—all sizes.

FOR SALE BY

Gilmore Machinery Co.,

809 W. Lake St., Chicago, Ill.

Lathe, Monarch 16"x6" q. c. g., collets, t. a.
Press, No. 5 R. & K., o. b. l., 2 1/2" stroke.
Press, No. 13 Robinson horning.
Radial drill, 2" American s. p. d.
Square shear, 36" Pexto power, 14" cap.

FOR SALE BY

Rosenkranz, Weisbecker & Company, Inc.

2308 Singer Building, New York, N. Y.

Boring mills, 42" N-B-P vertical, motor drive.
Boring mills, 60" Gisholt, rapid traverse, m. d.
Grinder, 26"x120" Landis, plain, cylinder.
Hammers, 6-N Nazelair, motor drive.
Keyseater, No. 3, Baker, motor drive.
Keyseater, No. 20 Catlin, motor drive.
Lathe, 72"x60" Putnam, gear head, motor drive.
Lathe, 64"x25" Gleason, motor drive.
Lathe, 28"x17" Chard, motor drive.
Multiple spindle drills, No. 14 Natco, motor, drive, 16x24" rectangular head.
Multiple spindle drills, No. 36 Natco, m. d., 20" round hd. Planer, 72"x72"x12" Cincinnati 3 heads, m. d. Radial drills, 2" and 5" American.

FOR SALE BY

R. A. Vine,

652 West Willis Ave., Detroit, Mich.

Grinder, 12x36" Landis plain cyl.; power feed; betw. centers 40"; W. S. table 7x63"; wheel 20"x2"; self-contained c/s.
Grinder, No. 13 B. & S. tool and cutter, power feed, W. S. table 4x39"; including internal spindle, diamond holder, steady rest, face plate, centers, cone drive. Grinders, 4 internal.
Lathe, 16"x8" Hendey; taper att., chuck, face plate, tool post, driver plate, centers, steady rest, cone dr. Turret lathe, No. 2-A Warner & Swasey, rebuilt, full univ., geared head; 3 1/2" cap'y bar stock, 16" swing over ways, 13" over cross slide; hexagon turret; pressed steel pan, pump, collets and lots of tools; serial 210,000; motor drive.

FOR SALE BY

Wigglesworth Machinery Co.

199 Bent Street Cambridge, Mass.

Boring mill, No. 21 Lucas horizontal.
Boring mill, 24" bar Cleveland.
Lathe, 20" x 12" Monarch, geared head.
Miller, No. 3 Kempsmith universal.
Miller, No. 4 Cincinnati, rapid traverse.
Radial drill, 5" American triple purpose.
Shaper, 32" Hendey, vee ram, Timken bearing.
Send for Complete Stock List.

USED AND REBUILT MACHINERY

FOR SALE BY

Superior Manufacturing Company
Albert City, - - - Iowa

Band saw, 26".
 Loom with winding equipment for weaving screen cloth.
 Plating motor generator set, 300 amp., 6 volt, Hobart.
 Saw, No. 7 Atkins Kwick Kut.
 Screw machine, No. 53 National, 4 spindle automatic.
 Tapper, Garvin 2-X automatic.
 Wire straightener and cutting machine, 1 Shuster.
 All in A-1 condition, at bargain prices.

FOR SALE BY

United Machinery & Supply Co.
1241 Walton Ave., - St. Louis, Mo.

Baling press, for scrap, plunger type, b. d.
 Brake, leaf, D & K 10' x 10' ga. No. 204 a. c. m. d.
 Cut-off mch., "Radial" m. d. 7 1/2 h. p., a. c., 3400 rpm.
 Drill, Harrington 6 spindle, 4" cap. b. d., 17 feet wide.
 Hammer, 150 lb. air Nazel type, belt drive.
 Hammers, board drop, 600 and 400 lbs. Bliss.
 Miller, No. 6 Becker vertical, all power feeds, b. d.
 Shear, circle & flanging, No. 208A Niagara, a. c. m. d.
 Shear, 5' x 16 ga. cap. Excelsior, b. d., b. g., a. c. m. d.
 Threader, pipe, 2" Landis a. c. m. d. with dies.

FOR SALE BY

Norton-Broadway Machinery Co.
610-614 Baymiller St., Cincinnati, Ohio

Armature winding machine, with d. c. motor.
 Drill, upright, 28" Kern, back geared.
 Drill, upright, 20" Plain with pat. chuck table.
 Emery stand, Webster & Perks.
 Forge, large, blower and anvil.
 Grinder, wet emery, Barnes, wheel 16" x 2".
 Lathe, engine, 45" x 16" 8" Fine-to, triple geared.
 Price for the lot \$475 cash, FOB Springfield, Ohio

FOR SALE BY

Surplus Stock & Machinery Co.,
620 W. Lake St., - Chicago, Ill.

Drill presses, 1, 2, 3 & 4 spindle high speed ball bear., all makes, Nos. 1 & 2 Morse taper, hand or pw. feed.
 Lathe, 16" x 8" Heudey taper attach., draw bar, collets.
 Lathe, 16" x 8" Lodge & Shipley 12 speed selective hd.
 Lathe, 16" x 10" Monarch, geared head, motor in base.
 Mill, No. 2 Cincinnati plain, high power, late type.
 Mill, No. 2 Brown & Sharpe universal, cone driven.
 Shapers, 16", 30", 24" Gould & Eberhardt.

Complete stock of metal working machinery.
 Send us your inquiries.

FOR SALE BY

Lang Machinery Company **28th St. & A. V. R. R. Pittsburg, Pa.**

Air compressors, (2) Sullivan, 480 c. f. 100 lb. b. m. d.
 Automatic, No. 32 National Acme 4 spindle, cap. 1" b. d.
 Automatic, model M Cleveland, 4 spindle, motor drive.
 Automatic, No. 2-G Brown & Sharpe, cap. 3" m. d.
 Bender, No. S19 Kane & Roach, 4" rd. motor drive.
 Bolt cutter, 1" Landis, 12" Acme, agl. hd., b. d.
 Boring mill, 30" Bullard, threading attach., s. p. d.
 Boring mill, vertical 94" Sellers, 2 heads, belt drive.
 Boring mill, horiz. 6" Bement-Miles, floor type, m. d.
 Borer, port., N. B. Duplex, 48" bars, m. d.
 Boring mill, horizontal No. 0 Giddings & L. 3", m. d.
 Brake, No. 204 D. & K., 8" x 10 ga. m. d.
 Brakes, leaf, D & K, 10' x 10 ga., 10' x 16" m. d.
 Brake, press type, 8' x 20 ga. Vulcan, b. d.
 Buffer and polisher, 7 1/2 h. p. Marschke, 220/3/60.
 Drill, heavy duty No. 1 Baker, 24" capacity 2 1/2", s. p. d.
 Drills, radial, 24" Cincinnati-Bickford, t. a. m. d.
 Drills, upright, 14" to 32", belt drive.
 Drill, sens., No. 1 Avey, ball bearing, 7" overhang, m. d.
 Drill, 4 spindle No. 2 Foste-Burt, cap. 1 1/2", m. d.
 Furnaces, hardening, Tane Jones 27" x 20" 72", new.
 Gear hobber, No. 18 H N Gould & Eberhardt, m. d.
 Gear millers, No. 1 Hilton, capacity 4" belt drive.
 Grinder, plain, 12" x 72" Landis, self-cont. motor drive.
 Grinder, surface, 12" Pratt & Whitney vertical, m. d.
 Hammer, 100 lb. Bradley cushion hilt belt drive.
 Hammer, steam forging 5000-lb. Niles-Bement-Pond.
 Keyseater, No. 2 Baker, 2", belt drive.
 Keyseater, No. 4 Mills & Merrill capacity 2 1/2" b. d.
 Lathe, 14" x 6" Lodge & Shipley, geared head, s. p. d.
 Lathe, 14" x 6" Hendey, tie bar, c. g. t. a. b. d.
 Lathe, 16" x 8" American high duty, c. g. t. a. b. d.
 Lathe, 24" x 14" Monarch, geared head, c. g. t. a. b. d.
 Lathe, 25" x 10" LeBlond, c. g. t. b. g. c. h. k., t. a. b. d.
 Lathe, 26" x 12" Bridgeford, hvy. duty, c. g. d. b. g. b. d.
 Lathe, 36" x 18" N. B. P. c. g. t. a. b. d.
 Lathe, 40" x 10" H.-S. & G. geared head, m. d.
 Lathe, 51" x 32" New Haven, triple geared, motor drive.
 Lathe, turret, No. 2-A Warner & Swasey, s. p. d.
 Lathe, turret, 24" Steidle, 6 1/2" hollow spindle, m. d.

Miller, plain, No. 2 Cincinnati, tbl. 46-4" x 10", b. d.
 Miller, plain, No. 2 LeBlond, tbl. 52" x 11-3", b. d.
 Miller, plain No. 20 Ohio, table 52" x 11-4", belt drive.
 Miller, plain No. 4 LeBlond, table 72" x 16", belt drive.
 Miller, plain, No. 24 Brown & S. tbl. 80" x 17-3", b. d.
 Miller, universal No. 2B Hendey tbl. 45" x 10", b. d.
 Miller, vertical, No. 3 Brown & S. table, 49 1/2" x 16 1/2".
 Miller, vertical, No. 4B Becker tbl. 36" x 10 1/2", m. d.
 Miller, vertical, model "B" Becker tbl. 57" x 12", s. p. d.
 Pipe machines, Landis 3" to 2", belt drive, (2).
 Pipe machine, 3" Saunders, 4" to 3", belt drive.
 Pipe machine, No. 304-B Oster, 1" to 4", motor drive.
 Pipe machine, 8" Williams, 2 1/2" to 8" motor drive.
 Pipe machine, No. 114 Merrill, 2 1/2" to 12", motor drive.
 Pipe straightener, vertical, 8" Woodward, m. d.
 Planers, 36" x 36" x 10" Cincinnati, 2 heads, belt drive.
 Planer, 30 x 30" x 8" Cincinnati, 1 head, b. d.
 Presses, No. 5 Bliss stiles type, bed 17" x 20", at 2", b. d.
 Press, trimming, No. 12 Erie, bed 26" str. 5 1/2", side sh.
 Press, wheel, 200-ton Hydraulic, 48" x 100", m. d.
 Profilers, Nos. E3 and E4, Keller, motor drive.
 Punch & shear, "C" Cleveland 18/16" x 1" belt drive.
 Rolls, angle, Kane & Roach 2" x 2" x 1", motor drive.
 Saws, hack, 12" x 12" Racine, single pulley drive.
 Saw, hack, 13" x 16" Peerless, motor drive.
 Shaper, 28" Queen City, back geared, belt drive.
 Shapers, 24" Gould & Eberhardt, V-rail, belt drive.
 Shaper, 24" Smith & Mills, back geared, belt drive.
 Shaper, 20" Cincinnati, back geared, belt drive.
 Shaper, 16" American, back geared, belt drive.
 Shear, alligator, No. 14 D. & K., 2", motor drive.
 Shear, rotary, Lennox, 8", 42" throat, b. d.
 Shear, square 36" x 3/16" Niagara motor drive.
 Shear, square 156" x 1 1/2" Hyde Park, 18" gap, motor drive.
 Straightener, No. 24 Sutton-Abramson, m. d.
 Straightener, No. 1 Kane & Roach, cap. 3" rd. m. d.
 Straightener, pipe, 8" Woodward, vertical, m. d.
 Straightener, 14" x 4" F. B. Schuster, belt drive.
 Welder, arc, 300 amp. Westinghouse, a. c. m. d.
 Welders, arc, 300 ampere Lincoln, 220 volt, c. d.

USED AND REBUILT MACHINERY

FOR SALE BY

Modern Machinery Co.

243 Centre St., New York, N. Y.

Drill presses, Allen b. b., 2, 3, 4 and 6 spindles 12 & 15".
Grinders, B. & S. No. 1 universal.
Lathes.
Milling machines, Van Norman Nos. 2, 2 and 3, m. d. and s. p. d.
Milling machines, universal, B. & S., Cincinnati and Rockford.
Radial drills.
Screw machines.
Shapers.

FOR SALE BY

Joseph Beal and Company

465 Atlantic Avenue Boston, Mass.

Boring mill, Bullard 36" New Era, Serial No. 12,967.
Boring mill, Bullard 36" Rapid Production.
Boring mill, Cincinnati No. 3A hor. boring mill, s.p.d. Miller, Cincinnati No. 2 and No. 3 Hi-Power vert. spd. Radials, Cincinnati-Bickford 3 and 3 1/2 s.p. & m. d. Lathes, LeBlond 17" x 8" grd. hd., m. d. taper & rel. att. Turret, Jones & Lamson 3" steel head, arr. m. d. Shear, Wheeling No. 2-L heavy duty gap.
Press, Niagara No. 710-B double crank, 100 ton cap.
Welder, Thompson 100 KVA, 220 volts, motor drive.

FOR SALE BY

West Penn Machinery Company

1210 House Building,

Pittsburg, Pa.

Air compressors, 30 to 2500 cubic feet.
Automatic National Acme "C" 9/16, motor drive.
Blower, No. 4 Roots, capacity 2110 c. f. m.
Bolt cutter, Acme 2" belt drive.
Boring mill, hor. 3" Giddings & Lewis s. p. d.
Boring mill, 42" King, belt drive.
Boring mill, 62" Betts, 2 heads, belt drive.
Boring mill, hor. 34" Rockford m. d.
Brake, 7 x 10 gauge Dreis & Krump motor drive.
Bulldozers, Nos. 2, 4, 6, 9, 28, & 30.
Crane, 5-ton Case, 65' span, 220-d.c.
Drill, radial, 4" Prentice, tapping attachment, b. d.
Drill, radial 8" Cincinnati-Bickford, motor drive.
Drill, radial, 8" Fossick s. p. d.
Drill, radial 6" Reed-Prentice, single pulley drive.
Drill, multiple 24 spindle No. 30 Natco.
Drills, upright 10" to 36".
Engine, gas, 20 horse power Bessemer.
Flanger, McCabe, 4" capacity, dies.
Flanger, No. 208 Niagara, 10 Ga. b. d.
Gear cutter, No. 5 Brown & Sharpe, 60x11 motor drive.
Gear cutter, 18-H Gould & Eberhardt.
Gear cutters, 11", 15" & 24" Gleason.
Gear tester, bevel 18" Gleason.
Grinder, centerless, No. 2 Cincinnati m. d.
Grinder, roll, Farrel 28" x 64".
Grinder, double end 2 horse power 220/440/3/60.
Grinder, D.E., 3 horse power 220/3/60.
Grinder, disc, No. 8-20" Besly, belt drive.
Grinder, disc, No. 4 Gardner, motor drive.
Grinder, Gisholt tool and cutter, motor drive.
Grinder, surface 8" Heald b. d.
Grinder, internal No. 60 Heald, belt drive.
Groover, No. 275-A Niagara, 6", 16 ga. motor drive.
Hammer, power, 50-lbs. Blackright.
Hammer, power, 90-lb. upright, belt drive.
Hammer, power, 100 lb. Braddock cushion.
Hammer, Bradley 500 lb. upright.
Hammers, Nos. 2-B, 3-B, 4-B, Nazel.
Hammers, steam, forging & drop.
Hoist, 1 ton Shepherd 220-V, direct current.
Keyseater, No. 2 & No. 0 Mitts & Merrill, belt drive.
Ladies, 20 ton Whiting, top pour.
Lathe, 11" x 5" Meyers, plain change gear, belt drive.
Lathe, 16" x 6" Fossick, double back gear, c. g. g.
Lathe, 18" x 8" Springfield, geared head.
Lathe, 20x10 geared head Schellenbach.
Lathe, 22"x12" R-L quick change gear, d. b. g.
Lathe, 24x10 Lodge & Shipley, c. g. c. d. b. g.
Lathe, 24"x15" Prentice, geared head s. p. d.
Lathe, 42"x16" Schumacher Boye, c. g. c., belt drive.
Lathe, spinning 32" belt drive.
Lathes, turret, No. 4 Warner & Swasey, belt drive.
Lathes, turret, No. 6 Warner & Swasey, geared head.
Lathes, No. 2 Warner & Swasey turret, belt drive.
Lathes, turret, No. 2A Warner & Swasey, motor drive.
Lathe, turret, 17x6 LeBlond double back gear.
Miller, vert. No. 1 Brown & Sharpe, belt drive.
Miller, vertical No. 2 Knight.

Miller, vertical No. 6 Becker, motor drive.
Mixers, Sprout-Waldron, batch & liquid.
Pipe machine, 2" Landis, belt drive.
Pipe machine, 4" Oster, 220-3-60 motor drive.
Pipe mach, 2", 6", 8", 12" Williams, motor drive.
Planer, 36x36x10" Cincinnati belt drive.
Planer, 42x42x12" Cincinnati, 3 heads, belt drive.
Planer, 60x60x20" Pond motor drive.
Press, cam, No. 69N Bliss, double action inclineable.
Press, hydraulic 100-ton Southwark.
Press, hydraulic 200-ton Oilgear.
Press, horning 42-A Toledo belt drive.
Press, 19 Bliss open back inclineable 2 1/2" stroke.
Press, No. 4 Toledo o. b. l., 3 1/2" stroke.
Press, 7 1/2 Bliss, 1 1/2" stroke I. R.
Press, No. 55 Toledo, bed 20x19.
Press, No. 58 Toledo, 8" stroke.
Press, No. 77 1/2 Bliss, 8" stroke.
Press, double crank No. 5 Bliss, 2" stroke.
Press, gap, No. 74 Bliss consolidated 4 1/2" stroke.
Press, screw, No. 87 Niagara.
Press, 6 spindle, Waterbury-Farrell.
Punch, EF Cleveland, 36" throat, 1 1/2" thru 1".
Punch, No. 4-A Kent Owens universal combination.
Pumps, centrifugal 6", 4", 1", motor drive.
Riveters, air, hammer, spinning.
Rolls, angle, Niagara 14x1 1/2".
Rolling mill, cold 9"x18" motor drive.
Saws, friction, Nos. 2, 3 & 4 Ryerson motor drive.
Saw, cold, 48" Newton motor drive.
Saw, hack, Peerless, 6x6 220-3-60.
Saw, hack, Racine 6x6 motor drive.
Saw, hack, Peerless, 13"x16", motor drive.
Saw, shaping, Peerless 6x6 220-3-60.
Scale, sheet building, 2500 lbs.
Shapers, 16", 20", 24" & 36" Gould & Eberhardt.
Shears, alligator, 11", 9", 3", 4" & 6".
Shear, Angle 6x6x4 Long & Allstatter.
Shear, circle, Niagara, 4" cutters.
Shear, circle No. 3 Bliss, 40"x20" gauge.
Shear, bar 1 1/2", New Doty.
Shear, squaring No. 48 Excell 14ga. bls. 53".
Shear, plate, 80"x14" Pels.
Shear, 24"x16" Bliss, belt drive.
Shear, rotary 24" throat capacity 1", motor drive.
Slitter, gang, 36" Voder motor drive.
Slitter, gang, 36" Braddock, belt drive.
Shear, paper 45"x14" Kent, belt drive.
Slotters, 6" & 24" Newton.
Straightener, 9/16"x20" Shuster V belt.
Straightener, AS & TP 12"x3/16", belt drive.
Straightener, 42" Aetna std. 17 roll 28".
Straightener, 48" Aetna-Standard, 17 roll 34".
Straightener, No. 5 K & R, 24" square belt drive.
Tumbling barrel, 34"x45", belt drive.
Thread roller, No. 201 V & O., 4", belt drive.
Upsetters, 1" to 6".
Welder, 6k, w. spot Thompson.
Welder, butt 1 1/2" Winfield.

USED AND REBUILT MACHINERY

FOR SALE BY

Faylor-Strafer Machinery Co.
136 Liberty St., - - New York, N. Y.

Bolt cutter, 2" Landis double head, motor drive.
 Boring bar, 10"x20" Underwood portable.
 Crane, 10 ton Niles. 37' span, a. c. motors.
 Grinder, No. 18 Blanchard high power vert., sur., m. d.
 Lathe, 36"x14" Bridgeford, geared head, m. d., taper.
 Lathe, 48"x34" Bridgeford geared head, motor drive.
 Miller, Becker, duplex Lincoln type.
 Miller, Brown & Sharpe No. 24 plain.
 Shear, squaring, 30" Bliss, capacity 5/16".

FOR SALE BY

D. H. Prutton Machinery Co.
5295 W. 130th Street Cleveland, Ohio

Automatic, Cleveland 8" model A and 8" M chucker.
 Drill, No. 2-2 spindle Aveumatic.
 Drills, 4" cap. Demco 4 spindle, power feed, b. b. (3).
 Gear hobbers, No. 1 Schuchardt & Schutte.
 Grinder, disc, No. 50 Gardner motor drive.
 Tappers, (5) Webster & Perkins 5 spindle vertical.
 Press, 106-74-754-Bliss-55-65-Consolidated.
 Press, cam drawing, No. 1 Bliss & No. 57 Toledo grd.
 Presses, No. 4 & 6 Zeh & Hahnemann inclinable.
 Welder, spot, 15 KW Federal, automatic.

FOR SALE BY

General Blower Company
401 N. Peoria St., - Chicago, Ill.

BLOWERS-FANS-EXHAUSTERS.
 For Dust Collecting - Ventilating.
 Oil and gas burners, cupolas, furnaces, etc.
 Roots-Connersville and centrifugal blowers.
 What are your blower requirements?

FOR SALE BY

Royal Machinery Exchange,
401-3 Broome St., New York, N. Y.

Lathe, 26"x10" Bridgeford, q. c. g., d. b. g., 3-
 step cone, cabinet leg. \$350.
 Lock seamers, No. 1 German, will seam 3" round cans;
 No. 4 Bliss, will seam 10" round cans.
 Millers, B. & S. No. 2 b. h. plain, s.p.d., \$650; Belton
 No. 25 (brand new). New price \$975, our price \$450.
 Power beading machine, diameter of shaft 1 1/2"x21"
 in length.
 Presses, Bliss No. 21, stroke 24" \$375;
 Ferracute DAG54, geared, double action \$400.
 Stamping presses (75) of various sizes and makes. All
 desired specifications can be furnished concerning
 stroke, die spaces and depth of throats. All rebuilt
 and guaranteed.

FOR SALE BY

Marr-Galbreath Machinery Company

Air compressor, 8x6" Gardner-Rix, Duplex.
 Air compressor, 9x8" & 10x8" 1-K, "ER" 1.
 Blowers, pressure, Am. 11-PB. 14,000 CFM.
 Boring mill, 42" Bullard, 1 swivel and 1 turret head.
 Boring mill, 30" Bullard or V.T.L., threading attach.
 Drill, 24" Aurora, tapping attachment.
 Drill, No. 11-H, Natco, 16-spindle, motor drive.
 Drill, radial, 34" Canedy-Otto.
 Drill, radial, 24" Drees, g. b., s. p. d.
 Fan, ventilating, No. 4 American, 1/60/110.
 Forging machine, 3" National, motor drive.
 Forging machine, 3" & 4" Ajax, motor drive.
 Forging machine, 14" Acme motor drive.
 Furnace, gas, Talc Jones, 25"x22"x12".
 Grinder, No. 210 Heald rotary surface.
 Grinder, 4 H.P. Mall, 1/60/110 flexible shaft.
 Grinder, No. 21 Landis 10"x30".
 Grinder, disc, No. 2 Gardner, 20" wheels, m. d. 3/60/220.
 Hammer, power, 50 lb. Boss, belt drive.
 Hammer, 200 lb. Beaudry, power.
 Hammer, 400 lb. Bliss board drop, belt drive.
 Hammer, 800 lb. Erie SF steam or air.
 Hammer, Syntrol Electric, 1/60/110.
 Hoists, chain, 1, 14, 2 & 3 tons.
 Keyseaters, 3 M. & M. belt.
 Lathe, 8" Hirth bench prec. thread, att., tur. m. d.
 Lathe, 16"x10" G-K., gear head, tap. att, form motor drive.
 Lathe, 18"x8" Superior, quick change gear, d. b. g.
 Lathe, 20"x10" Johnson quick change gear, tap. attach.
 Lathe, 22"x12" Rahn-Larmon, quick change gear.
 Lathe, 25"x14" LeBlond, geared head, motor drive.
 Lathe, 26"x10" Wolcott, d. b. g. & c. g.
 Lathe, 36"x18" L. S., for motor drive.
 Lathe, Monitor turret, 18"x8" Springfield.
 Miller, plain, No. 4 Ohio, 72"x30"x20".
 Nailing machine, No. 6 Morgan 8-track, m. d.
 Pipe machines, 2" 3" & 4".
 Polishing stand, 3 H. P., U. S., 3/60/220.
 Press, o. b. i., No. 4 Toledo, 3" stroke.
 Press, arbor 30 ton Lourie, Hydraulic.
 Press, OHI No. 21 Bliss, 1" & 2" stroke (3).
 Press, 77 1/2" Bliss, T. R., 10" stroke, double back gear.

57 Water St., Pittsburgh, Pa.

Press, D. C. No. 95-E Toledo, tie-rod: d. b. g., for m. d.
 Press, No. 59 Toledo tie-rod, d. b. g., friction clutch.
 Press, P-3 Ferracute motor drive.
 Press or shear, United 3 1/2" shaft, m. d.
 Pump, centrifugal 700 GPM., 4" disc.
 Punch & shear, hand, No. 5 Buffalo.
 Punch & shear, d. c. No. 46 Buffalo, 12" ths., 1-1/16"x3"
 triple gap punch and notcher.
 Roll, bending, No. 10 K. & R., 2"x3" cap., b. d.
 Punch and shear, No. 3 L. & A., 3"x3", 14" throat.
 Punches, hand No. 6 Kidder.
 Radial, 5' Fossdick, g. b., motor drive.
 Riveter, No. 3A, Grant, cap. 5/16", for motor drive.
 Riveters, Shuster, 3/16", belted.
 Riveter, No. 129 Grant, capacity, 8", motor drive.
 Saw, No. 6 Marvel, g. b., m. d.
 Saw, No. 10 Racine 9x9", belted.
 Saw, cold, No. 7 Espen-L., 15" belt.
 Saw, cold, No. 1 Newton, 4 1/2" belt.
 Saws, hack, 6x6" Peerless high speed, (2).
 Saws, universal shaping, 6x6", motor drive.
 Shaper, 21" Smith & Mills.
 Shaper, 34" Barker back gear V-ran, belt drive.
 Shear, angle 8x14 1/2" H. & J. motor drive.
 Shear, angle, 6x6 1/2" Kling, motor drive.
 Shear, rotary 232 Bliss 14 gauge.
 Shear, throats 18-M Marshalltown, motor drive.
 Shear, squaring, 42"x18 ga. Niagara, power.
 Shear, squaring, 48"x14 gauge Excelsior, power.
 Shear, bar 2 1/2" United, 24" blade, motor drive.
 Slotter, 6" Newton, table 17".
 Straightener, Gag., capacity 8" pipe, m. d.
 Straightening mach., No. 2 Sutton, b. b., m. d.
 Steam turbines, 100 horsepower 900 reversible (2).
 Tearing machines 600 & 1000 lb. hand.
 Transmissions, Reeves, size 00-E, (3).
 Truck, Cowan Transveyor 500 lb.
 Tumbling barrel, tilting, 20x14", gear con. m. d.
 Valve refacer, Kwik-Way, cabinet base, motor drive.
 Welder, Arc 300 amp, 3/60/220.
 Wheel press, 60 ton 34"x20", belt drive.
 Wheel press, 200 ton 33"x14" motor drive.

USED AND REBUILT MACHINERY

FOR SALE BY

Russell Machine Co.

438 Oliver Bldg. Pittsburgh, Pa.

Boiler, water tube, 400 horsepower, new.
 Boring mill, 14/20" Niles ext. type vertical.
 Boring mill, 44" N-B-P hor. dbl. spindle m. d.
 Crane, 10 ton hand power traveling, 46' 8" span.
 Forging and upsetting machine, 24, 32, 4 and 5" Ajax iron bed.
 Gear cutter, No. 3 Brown & Sharpe Automatic.
 Generating set, 400 KW A.C. steam.
 Hammer, 5000 lb. double frame NBP steam.
 Lathe, 20x16" Hendey, double friction countershaft.
 Lathe, 26"x11" Wickes heavy duty, double back gear.
 Lathe, turret No. 2-A W & S ser. above 125,000.
 Lathe, 32"x23" Pond triple geared.
 Milling machine, plain, No. 3 Cincinnati.
 Pipe cutting and threading machine 6" Merrill.
 Press, 250 ton hydraulic, platen 50"x100".
 Press, No. 30 Bliss OH M. D. with motor.
 Shaper, 24" Gould & Eberhardt.
 Shear, Lennox rotary bevel, capacity 4".
 Straightener, No. 1 Kane & Roach, cap. 1" rd. m. d.
 Welder, arc, 300 amp. Lincoln portable DC.

FOR SALE BY

Service Co.,

3732 Cedar Ave., Cleveland, Ohio

WELDERS.

General Electric 200-ampere, A. C. (10).
 Lincoln 200 ampere with 4 cylinder engine (4).
 Lincoln 300-ampere, gas engine drive (4).
 Transformer type A. C. welders, 230-440 volt (20).
 F. K. W. Lincoln 300 ampere a. c. drive (30).
 We rebuild, buy, sell and rent welders.

FOR SALE BY

E. L. Klauber Machinery Co.

320-322 South Third St. St. Louis, Mo.

Lathes, 14"x6" Hendey yoke head, collets. Bargains
 Screw machines, hand, 8", 10", 12", 14" Bar feeds.
 Tapping machines, automatic, No. 0, No. 1 & No. 2.
 Turret lathes, No. 1, 2, 3 & 4 Foster, Bardons & Oliver.
 Write for Complete Stock List.

FOR SALE BY

Scott-Bansbach Machinery Co.,

4607 West 20th St.,

Chicago, Ill.

Automatic screw mch., cone, 3", 4 spdl., b. d. \$1000
 Auto. screw mch., B. & S., Nos. 00, 0, 2, 3, 5000 to 1150
 Automatic screw machine, Brown & S. No. 00G
 with slotter, No. 9931 650
 Automatic screw mch., Brown & Sharpe No. 2
 Turret Former, cap. 3"x3" belt drive 500
 Automatic screw machine, Brown & S. No. 19
 high speed, capacity 1"x12" belt drive 400
 Automatic screw machine, Brown & Sharpe,
 No. 19 high speed, with motor 500
 Automatic screw machine, Davenport, 2", 5 spdl.,
 belt drive 500 to 750
 Auto. screw mch., Gridley 4 sp. Model G & F 1 1/2" 500
 Automatic screw machine, Cleveland, Model A &
 B 1 1/2" to 3 1/2" belt drive 250 to 450
 Automatic screw mch., Cleveland 7 1/2" Model A
 belt drive, 1394 2850
 Miller, No. 0, Bristol, hand, 14"x4"x14" 135
 Miller, No. 1A Milwaukee, g. h. cap. 22"x8"x19" 600
 Miller, No. 14B Milw., g. h. cap. 24"x10"x19" 800
 Miller, No. 28 Ohio, plain, b. d., 28x10x13, vise 600
 Miller, No. 3 Univ., K. & T., c. h., 26"x8"x16" 750
 Motor, 20 h. p. G. E., 220 volt, 60 cy., 3 ph., 1145
 r. p. m., complete 200
 Pipe machine, No. 308 Oster, 24" to 8", belt dr. 500
 Planer, 24x24x6 Ohio heavy duty, 1 head 350
 Planer, 73x73x12 Gray, 4 heads 1,500
 Press, Stecher screw for dies, 1700 pounds 225
 Press, No. 2 Walsh o. b. i., 14" stroke, 14 ton
 capacity, 1025 pounds, with safety 175
 Press, No. 3 Walsh o. b. i., 2" stroke, 22 ton capacity,
 2100 pounds 250
 Press, No. 2 Robinson o. b. i., 2" stroke, 31 ton
 capacity, 2500 pounds 275
 Press, No. 15 Wold, O. B. I., 2" stroke, 28 ton
 capacity 2000 pounds 225
 Press, No. 18 Robinson, horn type with table
 and motor, AC 220 volt 300
 Press, No. 51, Bliss, Arch. 4" str., 25 ton, 1800 lbs. 125
 Press, No. 51 Toledo arc, 24" str., 56 t., 5300 lbs. 350
 Press, Waterbury Farrell, straight sided, geared,
 8" stroke, 20 ton, 16" between 450
 Press, DG56, Ferracute, tog., 4" & 8" str., 100 ton 1000
 Press, Hercules, 15 ton, power forging or broaching
 punch, motor drive 200
 Punch, shear & bender, No. 73 Armstrong-Bloom 100
 Punch & shear, No. 52 Beloit comb. b. d., 1650 lbs. 175

Punch, Keeland, 10" throat, shears 5"x1" data... \$150
 Riveter, No. 14B, High Speed Hammer, capacity
 1", motor shell 100
 Riveter, No. 3A, High Speed Hammer, capacity
 1", with 1/2 h. p. motor, 220-60-3 200
 Riveter, No. 4A, High Speed Hammer, 1" capacity,
 no countershaft 200
 Riveter, No. 5A, High Speed Hammer, cap. 1",
 motor shell 275
 Riveter, Graut No. 52, 101A, 50 and 120, capacity
 1" to 4", belt drive 50 to 125
 Roll feed, double, 5 1/2" stock, 2" str., from No. 21
 Bliss press 75
 Saw, No. 2 Klem, band, for metal cutting, b. d. 200
 Saw, 34" American band for wood, b. d. 125
 Screw machine, Acme, plain head, 1 1/2"x4" b. d. 125
 Screw machine, B. & S., No. 1 plain head, 1 1/2"x3",
 belt drive 225
 Screw machine, Foster, No. 6 geared hd., 1 1/2"x8",
 power feed, s.p.d. 500
 Screw machine, S & K, No. 4, friction hd., 1 1/2"x8"
 belt drive 250
 Screw machine, Garvin, No. 3, friction head,
 1 1/2"x7", belt drive 150
 Shear, 10" Nia, cir., No. 20 ga., cuts 58" dia. cir. 45
 Shear, Niagara, No. 05 circle, No. 18 gauge, cuts
 48" circle 75
 Separator, McKinnis, for chips, blower type,
 belt or motor 250
 Separator, No. 1 American, cap. 1/2 bushel, b. d. 75
 Separator, American, cap. 1 1/2 bushels, belt driven 250
 Shaper, 16" Steptoe, back geared, crank with vise
 and countershaft 325
 Shaper, 20" American, back geared, crank, vise
 and countershaft 450
 Shaper, 24" Queen City, back geared, single pulley
 drive or motor drive 750
 Tapper R. & S., 1/2" cap., horizontal, on pedestal, 75
 Tapper, Garvin, No. 2 automatic, capacity 1" and
 1 1/2" belt drive 150
 Turret lathe, 16" Cincinnati Acme, friction head,
 2 jaw chuck, m. d. 1 h. p. 220-60-3 300
 Turret lathe, 24"x24", J. & L., geared head, tools
 for bar work 250
 Turret lathe, 36"x36", J. & L., geared head, with
 chuck for chuck work 350

USED AND REBUILT MACHINERY

FOR SALE BY

General Machinery Corporation
140 Federal St., Boston, Mass.

Grinder, Greenfield universal tool.
 Lathe, bench, Sloan & Chase, 8" capacity.
 Miller, LeBlond No. 25 plain.
 Miller, Becker No. 25 plain, with centers.
 Planers, Gray 22"x5' and 21"x7'.

FOR SALE BY

Surplus Material & Machinery Co.
8735 Kercheval Ave., Detroit, Mich.

Bolt threader, 1" Landis.
 Chaser grinder, No. 20 National Acme.
 Drill, 2 spindle Allen, motor drive.
 Drill, 21" Cincinnati, production, motor drive, (2).
 Drill, radial, 3" Western, arranged for motor drive.
 Die slotter, Garvin, 34" stroke.
 Folder, 42" Jarecki, power.
 Furnace, Bellevue electric, melting.
 Grinder, No. 2 Brown & Sharpe, surface.
 Grinder, No. 78 Wilmarth & Morman, surface.
 Grinder, No. 33 Abrasive, surface.
 Grinder, No. 3 Wilmarth & Morman, surface.
 Grinder, No. 22 Heald rotary, surface.
 Grinder, No. 70 Heald internal (2).
 Grinder, No. 2 Oakley universal, tool and cutter.
 Grinder, No. 1 Norton, tool and cutter.
 Grinder, No. 1 LeBlond, tool and cutter.

FOR SALE BY

Brown Machinery Company,
2233 N. 9th St., - - St. Louis, Mo.

Compressor, Herron-Bury CCB 14"x9"x8"; 20 HP mtr.
 Die filer, Oliver S-1, motor drive, bench type.
 Drills, 25" Amer., Bickford, G. & E.; 36" Cincinnati.
 Drill, radial, 3" Fosdick.
 Drills, 4-spindle, Footo-Burt; 5-spindle Allen; Natco type K 20-spindle.
 Grinders, disc, No. 6-20 Besly double spindle; No. 220 Badger with 18" press.
 Grinders, cylinder, Madison; No. 65 Heald.
 Grinder, universal, No. 2 Brown & Sharpe 12"x30".
 Hammers, 50-lb. Little Giant; 120-lb. Kane & Roach.
 Lathes, 26"x12" Putnam, taper att.; 18"x8" Lodge & Shipley; 18"x9" R. & M.; 17"x8" Sidney.
 Lathes, turret, 16", 21" and 24" Gisholt, chucks.
 Millers, No. 18 K. & T.; No. 2 LeBlond; Nos. 2 and 3 Kempsmith; No. 3-B Owen with vertical attachment and div. head; No. 21 Fox; No. 25 Becker-Brainerd.
 Pipe machine, No. 402 Oster 2" motor drive; No. 300A Oster 2", motor drive.
 Planers, 42"x12"x18" Putnam, 2 heads.
 Presses, o. b. i. Nos. 1, 2, 3, Loshough-Jordan.
 Press, straight slide, No. 7 Zeh & Hahnemann.
 Presses, vertical: 42-ton Elmes; 300-ton hydraulic.
 Punches, single end, Cleveland "C" 26" throat 4 in 4"; Rock River style L rapid action, 34" throat 4 in 4".
 Punch & shears, double end, No. L-10 Badger 10" throat, 4 in 4"; Queen City 4 in 4", motor drive.
 Saw, cold, No. 14 Higley.
 Scleroscope, Shore, Model C-2.
 Screw machines, No. 2 J & L; No. 21 Pratt & W. hand.
 Shapers, 20x8 Cincinnati, motor drive; 21" S. & M.
 Shear, 4" Lennox rotary bevel.
 Shear, GFM jig shear, 18 ga. cap.; motor drive.
 Shear, square, 9 ft. Stark, 18 ga. capacity.
 Welder, spot, Type 13 Toledo, capacity 20 ga.

Many other items—send us your inquiries.

FOR SALE BY

Nelson Machinery Co., Green Bay, Wis.

Drill, rad., 4" Bickford No. 1, s.p.d., No. 5 Morse tap.
 Generators, 200 k. w. Westinghouse, 3-60-2300-514 belted, bare, (2).
 Planer, 3x30x8" Gray, belt drive, single head.
 Punch presses, No. 65-N Bliss, 14" stroke, (2).
 Punch and shear, Lambertville double end, both with 22" throat, will handle 18" plate.

FOR SALE BY

M. A. Wertman Machinery Co.
623 Penton Bldg., Cleveland, Ohio

Automatic, Gridley 44" single spindle, (2).
 Automatic, Cleveland 13" Model A.
 Automatic, National Acme 3" four spindle (3).
 Grinder, Heald No. 22 12" rotary surface, s. p. d.
 Grinder, Heald, No. 70 internal, power fd., c./s. drive.
 Grinder, Heald No. 85 internal hand fd., c./s. dr., (3).
 Hobbers, Barber Colman No. 2 bench, complete s.p.d.
 Lathe, Reed Prentice 18"x16" g. h., s. p. d. t. a.
 Miller, Brown & Sharpe No. 00 hand.
 Miller, Cincinnati 12" Mfg., s. p. d.
 Nibbler, No. 2 Campbell 12" throat, 3" capacity, m. d.

FOR SALE BY

Segal Machinery Company
117 S. Clinton St., - Chicago, Ill.

Air compressors, 16 & 10x14 Inger-Rand, 600 cu. ft.
 Cap. M. D. with 100 H. P. Slip Ring Motor... \$ 750
 10x10 Inger-Rand, Class E, R-1, 223 C. F. Cap. \$ 375
 Boring mill, 42" Bullard, Two Heads... \$ 550
 Lathes, 14x6 Hendey, q.c.r., Taper and Rel. Att. \$ 550
 24x12" Milwaukee, taper attachment... \$ 500
 Millers, No. 2 Kempsmith Universal, with dividing head, tailstock, spiral gears and vise... \$ 750
 Radial drill, 5" Niles-Bement-Pond Single pulley drive, through gear box, 12" round column... \$ 450
 Screw machines, No. 0 Brown & S. automatic... \$ 185
 14" Acme universal, geared hd., collets & tools... \$ 500
 Shaper, 20" Gould & Eberhardt, High duty... \$ 550
 Partial list — Send us your inquiries.

FOR SALE BY

Reliance Machinery Sales Company
1405 Brighon Place, N.S. Pittsburgh, Pa.

Air compressor, 1190 cu. ft. Ingersoll-Rand.
 Drill, 3 spindle Footo-Burt, adj. head, No. 5 MT.
 Drill, 25" Prentice, sliding head, tapping attachment.
 Drills, radial, 3", 4" and 5", tapping attachment.
 Grinder, No. 2 Greenfield universal tool and cutter.
 Grinder, No. 2 Brown & Sharpe surface, motor drive.
 Lathe, 48"x18" American, cone, triple geared, cheap.
 Lathe, 38"x18" New Haven, cone head, cheap.
 Miller, No. 3 B. & S., plain, table 16"x54", cone.
 Planer, 36"x36"x12" Cincinnati, 2 heads.
 Planer, 20"x20"x4" Pratt & Whitney, 1 head.
 Press, No. 6 Toledo, o. b. i., 54" stroke.
 Press, No. 58 Toledo geared, 7" shaft 8" stroke, high die space (26"); about 35,000 lbs.
 Press, double, crank, Robinson, 80" wide, 4" shaft, 3" stroke, geared, 15,700 lbs.
 Prem. Waterbury, open back, geared, 3" shaft, 5" stroke, weight about 4000 lbs.
 Shapers, 16", 20" and 24", various makes.
 Wire straightener & cut-off, 1/2"x5" Shuster.
 Wire straightener & cut-off, 1/2"x12" Shuster.
 What do you need? What have you for sale?

USED AND REBUILT MACHINERY

FOR SALE BY

J. Lee Hackett Company
5838 Commonwealth Ave., Detroit, Mich.

Shaper, Gould & Eberhardt 24", motor driven, universal table. Excellent condition.

FOR SALE BY

J. Bleser Mfg. & Machinery Co.
209 N. 16th; P.O. Box 793 Springfield, Ill.

Grinder, No. 14 Landis 10x30.
Lathe, 24"x16" Prestite I. c.
Lathe, 36"x18" Lodge & Shipley, q. c., arr. m. d.
Motor, 50 H. P. 3-40-220-560.
Radial drill, 7 ft. Bement, cheap.

FOR SALE BY

Belyea Company, Inc.
150 W. 18th St., - New York, N. Y.

GUARANTEED electric motors, generators, m. g. sets, transformers, frequency changers, gas eng. sets, rotary converters, centrifugal pumps, condensers, starting equipment. All sizes. Largest stock in the East. Prompt delivery. We also buy and exchange.

FOR SALE BY

Joseph Hyman & Sons,
Tioga and Almond Sts., Philadelphia, Pa.

**WORLD'S LARGEST STOCK
POWER PRESSES**

No. 10 Bliss, double crank, tie rod, 62", shaft 10"-11".
No. SR 202 Ferracute double crank 52", shaft 7".
No. 165S Consolidated, double crank, 41", shaft 4 1/2".
No. 754B Bliss No. 764 & No. 77 Consolidated, gap types.
No. 4 & No. 14B Bliss toggle presses.
No. 168, No. 164, No. 171S Toledo toggle presses.
No. 594 Toledo, tie rod, No. 201 Ferracute, 200 ton.
No. 774 Bliss, tie rod, 12" stroke, straight side.
500 ton American Can coining.
150 ton No. E 52 Ferracute, 75 ton No. E51 Ferracute.
250 ton Waterbury Farrel coining.
50 ton No. 3 Bliss coining.
Squaring shears, various sizes.
These and hundreds of others of popular makes and sizes, are in stock at our warehouse here.
Rebuilt and Guaranteed.

FOR SALE BY

The Nutmeg State Machinery Corp.
1041-1051 State St., New Haven, Conn.

Brake, power press type, George Ohl, 10' 10 gauge capacity, arranged for motor drive. Excellent condition. Price \$1250.00 F.O.B. cars, Bridgeport, Conn.

FOR SALE BY

Industrial Machinery Company, Inc.
2200-2370 Fletcher Av. Indianapolis, Ind.

CINCINNATI PLANNER 42" between housings, 36" under the rail, table 8' between pockets; equipped with two heads on the cross rail.

FOR SALE BY

Standard Machinery Co.,
347 Indiana Ave. Grand Rapids, Mich.

Automatic, 14" Grid y, model F.
Boring mill, 42" Built rd vertical.
Boring mill, 24" Lucas horizontal.
Cold saw, 6" Higley.
Drill, Baker 3" heavy duty.
Drill grinder, Sellers 3" capacity.
Grinders, No. 60 Heald Cylinder (2).
Grinders, No. 2 LaSalle (2).
Lathes, 9" Porter-Cable manufacturing (14).
Miller, model C-1 Becker heavy vertical.
Presses, Waterbury Farrel's, s. 7" shaft, 30" bet. upr.
Press, No. 6 Consolidated.
Shear, No. 1236 Libert Hi-Speed.

LOOKING FOR TOOLS

Consult The

BUYERS GUIDE!

HEADQUARTERS FOR ALL TYPES OF USED METAL WORKING MACHINERY—STAMPING PRESSES—STRUCTURAL TOOLS

LOUIS E. EMERMAN AND COMPANY

CHICAGO TEL. BRUNSWICK 4130

1761 ELSTON AVE.

—Also FORGING EQUIPMENT—HYDRAULIC EQUIPMENT—Our Stock is Large and Varied—Our Prices Represent Real Values—SEND US YOUR INQUIRIES

USED AND REBUILT MACHINERY

FOR SALE BY

General Machinery Corporation
140 Federal St., Boston, Mass.

Grinder, Greenfield universal tool.
 Lathe, bench, Sloan & Chase, 8" capacity.
 Miller, LeBlond No. 3, plain.
 Miller, Becker No. 25 plain, with centers.
 Planers, Gray 22"x5" and 27"x7".

FOR SALE BY

Surplus Material & Machinery Co.
8735 Kercheval Ave., Detroit, Mich.

Bolt threader, 1" Landis.
 Chaser grinder, No. 20 National Acme.
 Drill, 2 spindle Allen, motor drive.
 Drill, 5 spindle Detroit horizontal, s. p. d.
 Drill, 21" Cincinnati, production, motor drive, (2).
 Drill, radial, 3" Western, arranged for motor drive.
 Die slotter, Garvin, 31" stroke.
 Folder, 42" Jarecki, power.
 Furnace, Bellevue electric, melting.
 Grinder, No. 2 Brown & Sharpe, surface.
 Grinder, No. 78 Wilmarth & Morman, surface.
 Grinder, No. 33 Abrasive, surface.
 Grinder, No. 3 Wilmarth & Morman, surface.
 Grinder, No. 22 Heald rotary, surface.
 Grinder, No. 70 Heald internal (2).
 Grinder, No. 2 Oakley universal, tool and cutter.
 Grinder, No. 1 Norton, tool and cutter.
 Grinder, No. 1 LeBlond, tool and cutter.

FOR SALE BY

Brown Machinery Company,
2333 N. 9th St., - - St. Louis, Mo.

Compressor, Herron-Bury CCB 14"x9"x8": 20 HP mtr.
 Die filer, Oliver S-1, motor drive, bench type.
 Drills, 25" Amer., Bickford, G. & E.; 36" Cincinnati.
 Drill, radial, 3" Fosdick.
 Drills, 4-spindle, Foote-Burt; 5-spindle Allen; Natco type K 30-spindle.
 Grinders, disc, No. 6-20 Besly double spindle; No. 220 Badger with 18" press.
 Grinders, cylinder, Madison; No. 65 Heald.
 Grinder, universal, No. 2 Brown & Sharpe 12"x30".
 Hammers, 80-lb. Little Giant; 120-lb. Kane & Roach.
 Lathes, 26"x12" Putnam, taper att.; 18"x8" Lodge & Shipley; 18"x8" R. & M.; 17"x8" Sidney.
 Lathes, turret, 16", 21", and 23" Gisholt, chucks.
 Millers, No. 11 K. & T.; No. 2 LeBlond; Nos. 2 and 3 Kempsmith; No. 3-B Owen with vertical attachment and div. head; No. 34 Fox; No. 25 Becker-Brainard.
 Pipe machine, No. 462 Oster 2" motor drive; No. 360A Oster 2", motor drive.
 Planers, 42"x42"x18" Putnam, 2 heads.
 Presses, o. b. i. Nos. 1, 2, 3, Loshough-Jordan.
 Press, straight slide, No. 7 Zeh & Hahnemann.
 Presses, vertical: 42-ton Elmes; 300-ton hydraulic.
 Punches, single end, Cleveland "C" 26" throat 1 in 4"; Rock River style L rapid action, 24" throat 1 in 4".
 Punch & shears, dble. end, No. L-16 Badger 10" throat, 1 in 4"; Queen City 1 in 4", motor drive.
 Saw, cold, No. 14 Higley.
 Scleroscope, Shore, Model C-2.
 Screw machines, No. 2 J & L; No. 24 Pratt & W. hand.
 Shapers, 20"x8 Cincinnati, motor drive; 21" S. & M.
 Shear, 1" Lennox rotary bevel.
 Shear, GEM jig shear, 18 ga. cap.; motor drive.
 Shear, square, 9 ft. Stark, 18 ga. capacity.
 Welder, spot, Type 13 Toledo, capacity 20 ga.

Many other items—send us your inquiries.

FOR SALE BY

Nelson Machinery Co., Green Bay, Wis.

Drill, rad., 4" Bickford No. 1, s.p.d., No. 5 Morse tap, Generators, 200 k. w. Westinghouse, 3-60-2300-514 belted, bare, (2).
 Planer, 3x30x8" Gray, belt drive, single head.
 Punch presses, No. 65-N Bliss, 14" stroke, (2).
 Punch and shear, Lambertville double end, both with 22" throat, will handle 14" plate.

FOR SALE BY

M. A. Wertman Machinery Co.
623 Penton Bldg. Cleveland, Ohio

Automatic, Gridley 41" single spindle. (2)
 Automatic, Cleveland 11" Model A.
 Automatic, National Acme 3" four spindle (3).
 Grinder, Heald No. 22 12" rotary surface, s. p. d.
 Grinder, Heald, No. 70 internal, power fd., c./s. drive.
 Grinder, Heald No. 85 internal hand fd., c./s. drive.
 Hobbers, Barber Colman No. 2 bench, complete s.p.d.
 Lathe, Reed Premise 18"x16" g. b., s. p. d., t. a.
 Miller, Brown & Sharpe No. 90 hand.
 Miller, Cincinnati 12" Mig., s. p. d.
 Nibbler, No. 2 Campbell 12" throat, 3" capacity, m. d.

FOR SALE BY

Segal Machinery Company
117 S. Clinton St., - Chicago, Ill.

Air compressors, 16 & 10x14 Inger-Rand, 600 cu. ft.
 Cap. M. D. with 100 H. P. Slip Ring Motor...\$ 750
 10x10 Inger-Rand, Class E. R-I. 223 C. F. Cap...\$ 375
 Boring mill, 42" Bullard, Two Heads...\$ 550
 Lathes, 14x6 Hendey, q. c. r., Taper and Rel. Att...\$ 550
 24x12 Milwaukee, taper attachment...\$ 500
 Millers, No. 2 Kempsmith Universal, with dividing head, tailstock, spiral gears and vise...\$ 750
 Radial drill, 5" Niles-Bement Pond Single pulley drive, through gear box, 13" round column...\$ 450
 Screw machines, No. 0 Brown & S. automatic...\$ 185
 14" Acme universal, geared hd., collets & tools...\$ 500
 Shaper, 20" Gould & Eberhardt, High duty...\$ 550
 Partial list — Send us your inquiries.

FOR SALE BY

Reliance Machinery Sales Company
1405 Brighton Place, N.S. Pittsburgh, Pa.

Air compressor, 1190 cu. ft. Ingersoll-Rand.
 Drill, 3 spindle Foote-Burt, adj. head, No. 5 MT.
 Drill, 25" Prentice, sliding head, tapping attachment.
 Drills, radial, 3", 3 1/2", 4" and 5", tapping attachment.
 Grinder, No. 2 Greenfield universal tool and cutter.
 Grinder, No. 2 Brown & Sharpe surface, motor drive.
 Lathe, 48"x18" American, cone, triple geared, cheap.
 Lathe, 38"x18" New Haven, cone head, cheap.
 Miller, No. 5 B. & S., plain, table 16"x24", cone.
 Planer, 36"x36"x12" Cincinnati, 2 heads.
 Planer, 20"x20"x12" Pratt & Whitney, 1 head.
 Press, No. 6 Toledo, o. b. i., 5 1/2" stroke.
 Press, No. 50 Toledo geared, 7" shaft 8" stroke, high die space (35") about 35,000 lbs.
 Press, double, crank, Robinson, 8" shaft, 4" shaft, 3" stroke, geared, 15,700 lbs.
 Press, Waterbury, open back, geared, 3" shaft, 5" stroke, weight about 4000 lbs.
 Shapers, 16", 20" and 24", various makes.
 Wire straightener & cut-off, 4"x8" Shuster.
 Wire straightener & cut-off, 1/2"x12" Shuster.

What do you need? What have you for sale?

USED AND REBUILT MACHINERY

FOR SALE BY

J. Lee Hackett Company
5838 Commonwealth Ave., Detroit, Mich.

Shaper, Gould & Eberhardt 24", motor driven, universal table. Excellent condition.

FOR SALE BY

J. Bleser Mfg. & Machinery Co.
209 N. 16th; P.O. Box 793 Springfield, Ill.

Grinder, No. 14 Landis 10x30.
Lathe, 24"x16" Prentice l.c.
Lathe, 36"x18" Lodge & Shipley, q. c., arr. m. d.
Motor, 50 H. P. 3-60-220-860.
Radial drill, 7 ft. Bement, cheap.

FOR SALE BY

Belyea Company, Inc.
150 W. 18th St., - New York, N. Y.

GUARANTEED electric motors, generators, m. g. sets, transformers, frequency changers, gas eng. sets, rotary converters, centrifugal pumps, condensers, starting equipment. All sizes. Largest stock in the East. Prompt delivery. We also buy and exchange.

FOR SALE BY

Joseph Hyman & Sons,
Tioga and Almond Sts., Philadelphia, Pa.

WORLD'S LARGEST STOCK
POWER PRESSES

No. 10 Bliss, double crank, tie rod, 62", shaft 10"-11".
No. SK 203 Ferracute double crank 52", shaft 7".
No. 168S Consolidated, double crank, 41", shaft 4".
No. 75B Bliss, No. 76 & No. 77 Consolidated, gap types.
No. 4 & No. 14B Bliss toggle presses.
No. 168, No. 164, No. 171S Toledo toggle presses.
No. 594 Toledo, tie rod, No. 201 Ferracute, 200 ton.
No. 77 Bliss, tie rod, 12" stroke, straight side.
500 ton American Can coining.
150 ton No. E 52 Ferracute, 75 ton No. E31 Ferracute.
250 ton Waterbury Farrell coining.
50 ton No. 3 Bliss coining.
Squaring shears, various sizes.
These and hundreds of others of popular makes and sizes, are in stock at our warehouse here.
Rebuilt and Guaranteed.

FOR SALE BY

The Nutmeg State Machinery Corp.
1041-1051 State St., New Haven, Conn.

Brake, power press type, George Ohl, 10' 10" gauge capacity, arranged for motor drive. Excellent condition. Price \$1250.00 F.O.B. cars, Bridgeport, Conn.

FOR SALE BY

Industrial Machinery Company, Inc.
2200-2300 Fletcher Av. Indianapolis, Ind.

CINCINNATI PLANER 42" between housings, 36" under the rail, table 8' between pockets; equipped with two heads on the cross rail.

FOR SALE BY

Standard Machinery Co.,
347 Indiana Ave. Grand Rapids, Mich.

Automatic, 14" Gridley, model F.
Boring mill, 42" Bullard vertical.
Boring mill, 24" Lucas horizontal.
Cold saw, 6" Higley.
Drill, Baker 3" heavy duty.
Drill grinder, Sellers 3" capacity.
Grinders, No. 60 Heald Cylinder (2).
Grinders, No. 2 LaSalle (2).
Lathes, 9" Porter-Cable manufacturing (14).
Miller, model C-1 Becker heavy vertical.
Presses, Waterbury Farrell's, s. 2" shaft, 30" bet. upr.
Press, No. 6 Consolidated.
Shear, No. 1236 Libert Hi-Speed.

LOOKING FOR TOOLS

Consult The

BUYERS GUIDE!

HEADQUARTERS
FOR ALL TYPES OF USED
METAL WORKING MACHINERY—
STAMPING PRESSES—STRUCTURAL TOOLS

LOUIS E. **EMERMAN** AND COMPANY

1761 ELSTON AVE. **CHICAGO** TEL. BRUNSWICK 4130

— Also FORGING EQUIPMENT — HYDRAULIC EQUIPMENT
— Our Stock is Large and Varied
— Our Prices Represent Real Values

SEND US YOUR INQUIRIES

Blue Book Buyers' Service

AVAILABLE TO OUR READERS

If you will list below the metal-working machines or machine shop equipment in which you are interested and mail to us, we shall be glad to refer your needs to the manufacturers or companies in position to serve you. Replies will come from them—not from us.

If you have any special engineering or shop problem with which you are experiencing difficulty, suggest that you send us full details for reference to our Engineering Service Department.

We are in the market for _____

Name _____

Address _____

Please check—

- ☐ Interested in new equipment.
- ☐ Interested only in used equipment.

Mail to the
HITCHCOCK PUBLISHING CO.
508 South Dearborn Street, Chicago, Ill.

\$ 750,000 SALE**WE ARE ORDERED TO LIQUIDATE IN DOUBLE QUICK TIME****ENTIRE STAMPING DIVISION AND TOOL AND DIE SHOPS
OF THE
HUPP MOTOR CAR CORPORATION****PRESS DEPT.**

- 1—No. 796½D Toledo, Toggle, Long Stroke, Tie Rod, Twin Drive, Air Cushions, M. D.
- 1—No. 268¼C Toledo, Toggle, Long Stroke, Tie Rod, Twin Drive, Air Cushions, M. D.
- 1—No. 795½A Toledo, Toggle, Long Stroke, Tie Rod, Twin Drive, Air Cushions, M. D.
- 1—No. 8F Bliss, S. Side, D-Crank, Twin Drive, Tie Rod, 20" Str., 122" Bet. Uprights Cushions, M.D.
- 3—No. 848¼ Hamilton, S. Side, D-Crank, Twin Drive, Tie Rod, 12" Stroke, 85½" Bet. Uprights, Air Cushions, M. D.
- 1—No. 95E Toledo, S. Side, D-Crank, Twin Drive, Tie Rod, 11" Stroke, 84" Bet. Uprights, Air Cushions, M. D.
- 1—No. 94½E Toledo, S. Side, D-Crank, Tie Rod, 6" Stroke, 60" Bet. Uprights, Spring Cushions, M.D.
- 3—No. 24E Bliss, Gap Type, D-Crank, Tie Rod, 6" Stroke, 61" Bet. Uprights, Removable Bed, Top Spring Cushions, M. D.
- 1—No. 164B Consolidated, S. Side, D. Crank, Grd. 5" str., 51" Bet. Uprights, Spring Cushions, M.D.
- 1—No. 94C Michigan, Gap Type, D-Crank, 2½" Stroke, 47" Bet. Uprights, Spring Cushions, Block Clutch, M. D.
- 1—No. 3½A Bliss, S. Side, D-Crank, Geared 7" Stroke, 44" Bet. Uprights, Pin Clutch, M. D.
- 1—No. 92CS Michigan, Gap Type, D-Crank, 3" Str., 36" Bet. Uprights, Pin Clutch, M. D.
- 2—No. 105 Consolidated, Gap Type, Inc., D-Crank, 3" Str., 33" Bet. Uprights, Sq. Pin Clutch, M. D.
- 2—No. 104 Consolidated, Gap Type, Inc., D-Crank, 2½" Str., 32" Bet. Uprights, Sq. Pin Clutch, B.D.
- 1—No. 59½ Toledo, S. Crank, Twin Dr., D-Geared, Tie Rod, Air Cushions, M. D.
- 1—No. 310A Bliss, S. Crank, Twin Dr., D-Geared, Tie Rod, 41½" Bet. Uprights, 18" stroke, M. D.
- 1—No. 59½ Toledo, S. Crank, S. Side, D-Geared Tie Rod, Fric. Clutch, 14" Stroke, M. D.
- 1—No. 5 Cleveland, S. Crank, S. Side, D-Geared, Tie Rod, Block Clutch, 5" Stroke, M. D.
- 1—No. 55 Consolidated, S. Crank, S. Side, Geared, 5" Stroke, M. D.

10—No. 6 & 6A Bliss Consolidated, O. B. I. with and without spring cushions.

10—No. 1, 2, 3, 4 & 5 Misc. O. B. Inc. Presses, belt and motor drive.

15—Horning Presses, No. 14½, 21, 24, 26 and 27, belt and motor drive.

TOOL AND DIE DEPT.

No. 16 Blanchard Grinder, 30" chuck, M. D.

No. 6 Defiance Horiz. Boring Mill, 4½" bar, M. D.
36"x54"x12" Liberty Openside Planer, box table, rapid traverse, M. D.

5½ American Triple Purpose Radial Drill, M. D.

No. 2 B & S. Surface Grinders, M. D.

8" Pearson Arter Rotary Surface Grinder.

No. 3 Cincinnati Universal Miller, S. P. D.

No. 3 Cincinnati Hi-Power Vert. Miller, S. P. D.

No. 2-B5 Milwaukee Plain Miller, M. D.

20" American Crank Shaper, M. D. gear box.

16" Hendey Crank Shaper, S. P. D.

16" G. & E. Crank Shaper, S. P. D.

26" Smith & Mills Crank Shaper, cone drive.

16"x6" American Geared Head Lathe, M. D.

16"x8" Hendey Lathe, B. D.

20"x10" Wolcott Lathe, B. D.

No. 2 B. & S. Universal Grinder, M. D.

No. 3 Thiel Die Filing Machine, M. D.

No. 6 Badger Dble. End Disc Grinder, B. D.

1, 2, 3 & 4 Spdl. Allen Hi-Speed B. B. Drills, M. D.

20, 21 & 24" Cincinnati, Superior & Barnes Camel Back Drills, M. D.

MISCELLANEOUS

Logemann Hydraulic Scrap Baler—60" Youngstown Roller Leveler—6' and 8' Chicago Hand Brakes—36" Niagara Foot Shear—8" Stohl Gap Shear—No. 1B Campbell Nibbler—Yoder & Pettingill Rotary Shears and Bumping Hammers—Federal Spot Welders—Gun Welders—Projection Welders—Butt Welders—Wiring Machines—Polishing Lathes—Lift Platforms—Narrow Gauge Trucks—Surface Plates—Vices—Benches—Layout Plates—Cyn. Pots—Motors—Belting—Line Shafting—Lift Trucks—Die Storage Racks, Scales, etc.

**ALL MACHINES INDIVIDUAL MOTOR DRIVE STILL IN OPERATION—CAN BE INSPECTED
UNDER POWER—EVERYTHING MUST BE SOLD—PRICED FOR QUICK SALE.****REPRESENTATIVE ON PREMISES DAILY***Illustrated Circular Available On Request—Send For Your Copy Now!!!*

WIRE

PHONE

WRITE

INDUSTRIAL PLANTS CORPORATION (OHIO)**6665 Mt. Elliott St., Detroit, Mich.****Toledo, Ohio—Detroit Phones Plaza 1467 and Plaza 3828—New York, N.Y.**

SPECIALS FOR MONTH OF SEPTEMBER

No. 1 Rock. Mill, comp. \$225
No. 1 1/2 Mill, motor drive. 375
No. 1 B. & S. M. in base 475
No. 2 B. & S. Mill, m. d. 675
Oster Pip-Mche, 2" cap. 50
20" B. B. Spinning Lathe 100
Filing machine, m. d. 50

Milling Machines

No. 4B K. & T. Plain, "Motor in Base" Pwr. Rapid Traverse.
Nos. 1A, 2A & 3A B. & S. univ.
Nos. 1B, 2B & 3B B. & S. Plain
"tap rd nose" motor drive.
Nos. 1, 2 & 3 B. & S. Plain and Univ. belt drive, complete.
Nos. 1, 2 & 3 B. & S. Vert. m. d.

Screw Machines

No. 6 B. & S. Automatic, m. d.
Nos. 10 & 2 B. & S. wire feed.
Nos. 1 & 3 Foster, wire feed.
No. 1B Foster & 1A W. & S. univ.
Libby Univ. Turret, 3 1/2" spindle.

Presses

No. 5A Toledo, bk. grd. m. d.
Nos. 1 & 3 Consolidated.
No. 4A Bliss horning, Stiles.

Saws

6"x6" Racine "shear cut" m. d.
8"x8" Racine high speed hack.
6"x6" & 9"x9" Peerless, m. d.

WE BUY INDIVIDUAL TOOLS OR COMPLETE PLANTS

CLINTON MACHINERY CO.,

12"x5" P. & W. Lathe \$100
15"x6" Monarch Lathe 150
18"x6" S. Bend Lathe 225
No. 1 Marvel hacksaw 25
No. 2 Marvel hacksaw 45
4"x4" Napier band hack 95
6"x6" Peerless hack saw 125

Lathes

12"x5" Sheldon, Reed & Sen. Falls.
12"x5" Hendey Q.C.G. "Enclosed Belted Motor" pan bed, t. a.
14"x6" Monarch, Rock. & So. Bend
14"x6" Hendey grd. hd. q. c. g. m. d.
15"x6" Bradford, taper att. q. c. g.
15"x8" Sen. Falls q. c. g. complete.
16"x8" Bradford, q. c. g. complete.
18"x6" Lodge & Shipley "bold type"
18"x8" So. Bend, motor drive, t. a.
18"x10" B. & E., motor drive, t. a.
20"x8" Hendey grd. hd. q. c. g., t. a.
Pan Bed, motor drive, complete.

Boring Mills

4" Feed-ick floor type, horizontal.
42" Niles vert. boring mill, 2 hds.
44" King vert. boring mill, 2 hds.
54" Colburn vert. bor. mill, 2 hds.

Shapers

7" Rhodes crank, vise & countershaft.
16" S. & M., & G. & E. complete.
20" Ohio, G. & E. Steptoe.
24" G. & E. & Milwaukee, complete.
28" Gould & Eberhardt, complete.

12" Klemm Band Saw \$225
2 Sp. Allen B. B. Drill 100
5 Sp. Gang Drill Press 100
4 Sp. Allen B. B. Drill, M.D. 175
5 Sp. Allen B. B. Drill, M.D. 275
Comb. Disc & Surface Grinder 95
17" Motor Driven Shaper 275

Grinders

Nos. 1, 2 & 3 B. & S. Univ. M.D.
No. 3 B. & S. Univ. C. & R., M.D.
No. 2 B. & S. No. 33 Abrasive & No. 78 Wilmarth & M. surface.
Nos. 1 & 1 1/2 Cinn. Univ. T. & C.
No. 6 Gardner & No. 8 Bealy disc.

Radials & Drill Presses

3" & 6" Western Hvy. Duty, M.D.
5" & 6" American Universal, M.D.
1, 2, 3, 4, 5 & 6 spdl. Allen B. B. high speed, belt and motor drive.
21" Cnn. b. g. shd. hd. t. a.; m. d.
20" to 28" back geared, power feed.
5 spdl Allen B. B. 12" ovrrg. M.D.

Miscellaneous

Gibb Seam Welder, 440 v. Model 430 HDA, 100 KVA. M. D.
No. 1/2 Buffalo Univ. Ironworker.
Speed Reducers, 2 HP, 36 to 1 rat.
3 1/2" Rhodes vertical slotter, com.
Rickert & Shaler vertical tappers.
300 Ampere port. arc welders
2 HP DeVilbiss comp. Tink Bear.

33 S. CLINTON ST.
CHICAGO, ILL.

DRILLS

No. 14 Colburn, Compound Tbl.
No. 2 Avey, arr. m. d. 12" overh.
No. 2, 4-spindle Aveyomatics.
No. C-5 Natco, 10 spindles.
1, 2, 3, 4 & 5 sp Allen, h. s., b. b.
4-spindle L-G No. 2 M. T. p. f.
3 spdl. Allen No. 2 M. T. p. f.
26" Barnes, sldg. head, tap att.
5" Dresses Univ. radial, arr. m. d.

GEAR HOBBERS

No. 3 Barber Colman, mtr. drive.
No. 12 B-C double overarm.

GRINDERS

Nos. 1-2-3 B. & S. univ., three mtr.
No. 11 Brown & S. plain, m. d.
12"x36" Thompson, univ. m. d.
No. 72 Heald internal, hydraulic.
No. 2 Gardner disc, 18", disc pr.
No. 24-53" Gardner disc, arr. m. d.
No. 20 Heald rotary surface.
No. 25 Heald, hyd. rotary surface.
No. 2 B & S surf. m. d. & b. d.

LATHES

14"x6" Hendey, q. c. g.

14"x6" Flather, q. c. g., arr. m. d.
14"x6" LeBlond, q. c. g., t. a.
15"x6" C. & J. c. hd. q. c. g., new.
16"x6" C. & J., grd. head, Timken bearing, motor in base, new.
16"x6" South B., q. c. g., t. a.
16"x8" Monarch grd. hd. Timken Bearing, Taper Attachment.
18"x8" South B. Gap Lathe, q. c. g.
18"x8" Hendey, q. c. g.
20"x8", 18"x8" B. & E., q. c. g., t. a.
20"x9" Hamilton, q. c. g.
20"x10" Schu. Boye & E., q. c. g.
24"x12" Schum., B. q. c. g., t. a.
28"x11" Hamilton q. c. g., t. a.
32"x44" x16" Schu. B. q. c. g.

MILLING MACHINES

No. 6 Whitney hand, motor drive.
No. 2 Van Norman Sub Head.
No. 2B Brown & S. plain, m. d.
No. 2A B. & S. Univ. m. d. & s. p. d.
No. 2 Kent-Owens, Hand.
No. 4B Becker, vert. b. b. spdl.
No. 1M Cincinnati, vertical, s. p. d.
Model "B" Becker h. p. vert.
No. 2 1/2 Rockford universal.
4 1/2"x12" Pratt & Whitney thread.

PRESSES

No. 7 1/2" Bliss, grd., tie rod 8" str.
No. 4A Bliss horning, Stiles type.
No. 1 to 8 Rockford o. b. i. new.
No. 1 & 1 1/2" Bliss Cam Draw, grd.
No. 6 Fox "Superflex".

SHAPERS AND PLANERS

10" Pratt & Whitney vertical.
32" Cincinnati, b. g. crank.
24" Rockford, gear box, arr. m. d.
24" Milwaukee b. g. crank.
24" Amer. & Stock, motor drive.
20" American, gear box, arr. m. d.
20" G. & E. & Milw. b. g. crank.
16" Gould & Eber., b. g. crank.
48"x48"x16" N. B. P. 4 heads.
36"x36"x16" Gray, 2 heads.

MISCELLANEOUS

No. 6 B. & S. auto. screw machine.
Bolt Cutter, 2 1/2" Landis Lead Scr.
No. 3A Univ. Hor. Boring Mill.
Broach, No. 3XA Oilgear Hyd.
Die filer, No. 3 Rearwin, m. d.
Die filer, No. 3 Thiel motor dr.
Gear Hobber, No. 1/2 Schu. & S.
Keyseater, No. 0 Baker, 1" cap.
Saw, 6"x6" Peer. univ. shaping m. d.

GEORGE M. BERNSTEIN & CO. 12 SO. CLINTON ST., CHICAGO, ILL.

MOREY VALUES

BORING MILLS

CLEVELAND No. 1, 2½" bar Horiz.
GIDDINGS & L. No. 0, 3½" bar hor.
LAMBERT 3" bar horizontal.
LUCAS No. 31, 3" bar horizontal.
LUCAS No. 32, 4" bar horizontal.
N.B.P. 4½" bar horiz.; duplex control.
BULLARD 24" N. E. type Vertical.
N.B.P. 72" Vertical; 2 heads; S. P. D.
POND 90" 2 heads; Vertical.
BULLARD 8" Mult-au-matic; 6 spindle.

LATHES

NILES-BEMENT-POND 46"x16', Q. C. G.
PITTSBURGH 36"x28', geared head.
PUTNAM 36"x28', grd. hd.—Nearly new.
BRIDGEFORD 36"x20'; 36"x40'; 36"x60'
boring.
HENDEY 14" to 24"x6' to 12'; yoke head.
LODGE & SHIPLEY 24"x10' cone drive.
200 other LATHES—all sizes.

MILLING MACHINES

B. & S. Nos. 2A, 3A, 4A, Universal; S.P.D.
BROWN & SHARPE Nos. 2, 3 Universal.
BROWN & SHARPE No. 1Y Plain.
B. & S. Nos. 2B, 3B, 4B, 5B Plain; S. P. D.
LEBLOND No. 3H, 4 Plain; cone drive.
CINCINNATI No. 3 Vertical S. P. D.
HANSON & WHITNEY Semi-auto. Thrd.
P. & W. 4½x12, 6x14, 6x48, 6x80 Thread.
CINCINNATI 18", 24", 48" Automatic.

DRILL PRESSES

NATCO Nos. 12, 13 and 22 Mult. spdle.
NATCO C11 Drill—mechanical feeds.
NATCO C13H Drill—hydraulic feeds.
PRATT & W. No. 12 rectangular head.

PLANERS

CLEVELAND 48"x48"x15'; 4 hds. openside.
AMERICAN 36"x36"x20'; 3 heads.
BETTS 42"x42"x12'; 4 heads.
NILES-BEMENT-P. 48"x48"x16'; 4 heads.

Partial list—1000 machines in stock. Send us your inquiry.

RADIAL DRILLS

CIN-BICKFORD 3', 3½' Plain; S. P. D.
MUELLER 4' Plain; motor drive.
DRESSES 5' Plain; S. P. D.
CINCINNATI BICKFORD 5' Univ.; S.P.D.

GEAR CUTTING EQUIPMENT

BARBER COLMAN Nos. 3 & 12 Gr. Hob.
BROWN & SHARPE No. 13 Gear Cutter.
GOULD & E. 36H, 18H, 12H Gear Hobber.
CLEVELAND 8 spindle Spline Hobber.
GLEASON 10", 15" Spiral Bevel.
GLEASON 24" bevel gear planer.
FELLOWS No. 8B Burnisher.
FELLOWS Nos. 6, 61, 515, 7 and 71.
LEES-BRADNER Lapper, cap. 1¼"x8".
WHITON No. 14 Spur and Bevel.

GRINDERS

BLANCHARD No. 16 hi-pwr.; floor m. d.
HEALD No. 255, 12" chuck rotary surface
PRATT & WHITNEY No. 14 surface.
PERSONS ARTER 12" Rotary Surface.
HEALD Nos. 55, 60, 65, 70 Internal.
LANDIS 6x18, 10x24, 12x36 Plain.
NORTON 10x36, 14x72 Plain.
LANDIS 16x32, 16x48 Crankshaft.
NORTON type B-81, 14x30—36" crankpin.
NORTON type L Universal.

AUTO. SCREW MACHINES

B. & S. No. 2G, No. 00G Automatics.
CLEVELAND 2", 2½" Model A Automatics.
GRIDLEY ¾", ¾", 1¼", 1¼", 2¼".
NEW BRITAIN No. 24 and No. 12A Auto.

MISCELLANEOUS

BLISS No. 7C Press; tie rd; Marquette Cush.
BLISS No. 25, 6000 ton Coining Press.
BLISS No. 4D double crank Press.
TOLEDO No. 26 Cam Drawing Press.
NIAGARA No. 372 Shear.
NIAGARA No. 848 Shear.
GOULD & EBERHARDT 24" Shaper.
ACME 2" Upsetting and Forging; all steel.
ACME ¾" Upsetting, Heading & Forging.
LANDIS 4" Single Head Bolt Cutter.
BUFFALO No. 25UD Combination Shear.

MOREY MACHINERY CO., Inc.
410 Broome Street, NEW YORK, N. Y.

BORING MILLS, Horiz.

- 2½" bar, N.B.P. knee, a. c.,
 3½" G. & L. No. 32.
 4" bar, Gisholt, Knee M/D.
 5" bar, Niles Floor Type.
 6" bar, N.B.P. Floor Type.

BORING MILLS, Vertical

- 36" Bullard Rapid, Pro.
 42" NBP, m.d.
 51" Bullard, Cone Drive.
 60" Gisholt, P.R.T.
 7' - 10' Betts Ext.

DRILLS, Radial

- 6", 7" Cincinnati.
 6" Reed-Prentice gear box m.d.
 6" Mueller, s.p.d., m.d.
 4" & 5" Amer. Triple Purpose.
 6" American, univ. & plain.
 3" American, sens. tapping.
 2, 4 & 6 Spindle Allens.
 4 spindle Kokomo, 12½", over.
 4 spindle No. 2B Edlund.
 24" & 20" Barnes, Weigel.
 32" Cincinnati, B. tapping, m.d.

GRINDERS

- 10"x36" Landis Plain (3).
 12"x32" No. 2 Landis Univ.
 12"x36" Landis Plain.
 10"x50" Norton Self Cont.
 26"x96" Landis Self Cont.
 26"x120" Landis Self Cont.
 48" Badger face, Hyd. Feed.
 No. 16 Blanchard, 26", belt.
 No. 11 Landis Tool & Cutter.
 No. 55, 60 and 65 Heald Cyl.

No. 70 Heald Internal.

- 14" P. & W Surface M. D.
 No. 2 B. & S. Surface M. D.
 No. 13 B. & S. universal.
 No. 105 River Internal.

LATHES

- 13"x6" Seneca Falls, t.s.
 14"x6" Monarch, q.c.g., cone.
 16"x12" South Bend.
 18"x8" Lodge & S., grd. hd.
 18"x8" Reed Prentice grd. hd.
 18"x8" Lodge & S., Cone.
 20"x10" Greaves Klusman.
 20"x10" Walcott, Q.C.G.
 22" 24"x8" Lodge & S., cone.
 24"x12" Putnam Q.C.G., cone.
 24"x16" Lodge & S., cone.
 24"x19" American L. C. G.
 28"x12" Schumacher Boye.
 28"x17" Chard, Grd. Hd.
 30"x18" Bridgeford turning.
 32"x17" Fifield, triple grd.
 32"x22" Schumacher Boye.
 36"x16" LeBlond, cone, L.c.g.
 42"x18" Pittsburgh QCG Cone.
 60"x23" Putnam, Cone.

MILLERS, Production

- 4" Pratt & Whitney Spline.
 8" & 12" Pratt & Whitney.
 18" Cincinnati auto. (8).
 28" Cincinnati Semi Auto.
 No. 7H Becker.

MILLERS, Plain

- No. 5 Cincinnati, Grd. Hd., P.R.T.
 No. 4G LeBlond, Geared Hd.

Nos. 3B & 2B Milwaukee, No. 2B Heavy B. & S. SPD.

- MILLERS, Vertical**
 Model CS, Becker Continuous.
 Model B Becker, feeds 36x14x15, s.p.d.
 Model C Becker, s.p.d.
 No. 5B Becker, Cone.
 No. 2 Knight.

PLANERS

- 84"x84"x18" N.B.P., M.D., 4 hds.
 72"x72"x14" Betts 4 hds.
 60"x60"x20" Pond, 4 heads.
 48"x48"x10" Detrick & H. open side.
 42"x36"x12" & 24"x6" Cincinnati.
 36"x36"x18" Sellers 4 heads.
 36"x36"x8" D. & H. Openside.
 30"x30"x10" D. & H. Openside.
 30"x30"x8" Gray.

TURRET LATHES

- 1½" & 2" P. & W's. (2).
 No. 4 W. & S. Univ. Cone.
 Nos. 3A & 2A W. & S. univ.
 No. 4 W. & S. univ., grd. hd.
 No. 4 W. & S. cone, screw.
 3½"x36" & 2½"x20" Acme.
 No. 5 Foster, 1-13/16" bar.
 24" Gisholt, AC M/D, 6½".
 21" Gisholt, AC M/D, 3½".
 4L Gisholt—no cross slide carriage.
 24"x24" Gisholt Cone 5½" H. S.
 2½"x24" & 3"x36" J. & L.

BENNETT-RAKIN MACHINE TOOL CO., Inc.

Offices: 30 CHURCH ST., NEW YORK CITY

LATHES AND GRINDERS

- 12x6" Hendey Geared Head taper.
 14x6" Hamilton Geared Head taper.
 16x8" Prentice Geared Head taper.
 16x8" Mueller Cone Drive.
 18x8" LeBlond Cone Drive.
 20x8" Hamilton Geared Head taper.
 20x8" Prentice Geared Head, Motor Drive.
 20x10" L. & S Geared Head, Motor Drive.
 20x10" American Geared Head MC.
 20x10" Hendey Cone Drive taper.
 20x12" American Geared Head, Motor Drive.
 21x14" LeBlond Cone Drive.
 20x10" Monarch Geared Head taper.
 30x10" Prentice Geared Head taper.
 30x16" Johnson Cone Drive.
 32x14" L. & S Cone Drive.
 32x28" Bullard Triple Geared.
 36x18" S & B Cone Drive.

- No. 2 Cincinnati Centerless Motor Drive.
 6x18 Landis Plain Self-Contained.
 6x32 Norton Plain Motor Drive.
 No. 11—6x32 Brown & Sharpe Plain Motor Dr.
 No. 12—8x36 Brown & Sharpe Plain Belt Drive.
 No. 14—10x48 Brown & Sharpe Plain Belt Dr.
 12x48" Queen City Plain Self-Contained.
 12x18 Cincinnati Plunge Cut Motor Drive.
 No. 1—10x24 Brown & Sharpe Univ. Belt Drive.
 No. 2—12x30" Brown & Sharpe Univ. Belt Dr.
 No. 3—12x40" Brown & Sharpe Univ. Mtr. Dr.
 No. 2 Brown & Sharpe Surface, Motor Drive.
 No. 2 Diamond Hyd. Surface Motor Drive.
 14" P. & W. Vert. Surface Magnetic Ch. M. D.
 6x10x36 Norton Type G Surface Motor Drive.
 26" Blanchard Vertical Motor Drive.
 30" Blanchard Vertical Motor Drive.
 No. 72 Heald Size. Hydraulic Motor Drive.

*We carry a large stock of used machine tools
 Your inquiries will be appreciated.*

The Strong, Carlisle & Hammond Company

1392 West Third Street,
 CLEVELAND, OHIO

Branch 2832 East Grand Blvd.
 Office: DETROIT, MICHIGAN

HILL-CLARKE QUALITY

No. 1-A Pratt & Whitney Jig Borer

BORING MACHINES

- 2½" bar Cleveland Horiz.
No. 3-A Universal, 3" bar.
No. 2 Rochester, 3" bar.
No. 1-3" Bar Lambert.
No. 3 Hamilton, 4½" bar, Fl. Type.
5" bar N-B-P Floor Type.

BORING MILLS

- 36", 42" Bullard "New Era".
42", 48", 54", 60" Colburn.
30", 52", 62" King.

DRILLS

- 1, 2, 4, 6-spdl. Leland-Giff. late type.
32" Cinn-Bickford Sliding Hd.
No. 2 Colburn, 2, 3, 4 Spdl.
No. 14 Colburn, Motor Drive.
No. 3-24" Defiance Hvy. Service.
Nos. 121, 314 Baker.
No. 210-3 Spdl. Barnes.
No. 4 Baush Multiple.
2" American Plain Radial.
4" Cincinnati-Bickford Plain Radial.
4" Fosdick Plain Radial.
5", 6" American Triple Purpose Radial.

GEAR CUTTERS

- No. 16-HS Gould & Eberhardt.
No. 18-H Gould & Eberhardt.
11" Gleason Bevel Generator.
No. ½ Pfauter Hobber.
No. 4-36", No. 4-48" Brown & Sharpe.
No. 3-52" Pfauter Hobber.
No. 2-60" Goss Hobber.
No. 6-60", No. 6-72" Brown & Sharpe.
Nos. 6, 61, 615, 62, 7 Fellows.

GRINDERS

- 20"x168" Landis.
26"x96" Landis.
No. 1, No. 2 Brown & Sharpe Universal.
No. 4, No. 4-A Landis Universal.
No. 70 Heald Internal.
14"x36" Pratt & Whitney Surface.
No. 25 Heald Rotary Surf., M. D.
No. 10-16" Blanchard Vert. Surface.
No. 16-A Blanchard Auto. Surface.
No. 2 Reid Surface (New).
No. 2-18", No. 6-26" Gardner B.B. Disc.

LATHES

- 14"x6" Hendey, Taper Att.
14"x8" Le Blond Grd. Hd. motor drive.
16"x6" Lodge & Shipley Sel. Grd. Hd.
16"x8" Lodge & Shipley.
17"x8" Le Blond Hvy. Duty Grd. Hd. M.D.

NORTON MOTOR DRIVEN GRINDERS

- | | |
|---------|---------|
| 6"x32" | 14"x36" |
| 10"x18" | 14"x50" |
| 10"x24" | 14"x72" |
| 10"x36" | 14"x96" |
| 10"x50" | 16"x50" |
| 10"x72" | 16"x72" |
| | 18"x96" |

22¼"x120"

- 18"x6" Monarch Grd. Hd., Motor-in-Base.
19"x8" Le Blond Hvy. Duty Grd. Hd. M.D.
20"x14" Lodge & Shipley Sel. Grd. Hd.
22"x12" Lodge & Shipley, multiple stops.
24"x12" Lodge & Shipley Sel. Grd. Hd.
24"x14", 16" American Grd. Hd.
30"x11" American Grd. Hd., Taper Attach.
30"x16" American, cone dr., taper attach.
54"x23" Johnson Triple Geared.
66"x21" Putnam Triple Geared.

33"-60"x16" LE BLOND SLIDING BED GAP LATHE.

MILLERS

- No. 1-B Milwaukee.
No. 2-B Brown & Sharpe Plain.
No. 2, No. 3 Cincinnati Plain.
No. 2-B, No. 3-B Milwaukee Pl., Motor-in-Base.
No. 3-B, No. 4-B Hvy., Brown & Sharpe, Pl.
No. 4 Cincinnati Plain.
No. 1½, No. 2 B. & S. Universal.
No. 2, No. 3 Cincinnati H. P. Vertical.
No. 5-B, No. 6 Becker Vertical.
18" & 24" Cinn. Auto. Duplex.
6"x14", 6"x48" Pratt & Whitney Thread.
No. 4, No. 8 Lees-Bradner Thread.
No. 5-48" Cincinnati Hydromatic.

PLANERS

- 24"x24"x12" Gray.
30"x30"x6", 9", 18" Cincinnati.
30"x30"x14" Gray, reversing motor dr.
36"x36"x8", 12", 18" Cincinnati.
36"x36"x12" Gray Maximum Service, M.D.
42"x42"x30" Niles-Bement-Pond, Rev. M.D.
48"x48"x10" Detrick & Harvey, Open Side.
60"x48"x20" Hamilton.
72"x60"x16" American Widened Pattern.
72"x72"x16" Cincinnati M.D.

TURRET LATHES

- No. 4 Warner & Swasey Univ. Grd. Head, m.d., auto. chuck and wire feed.
No. 5 Foster Univ. Tur., A. C. & W. F.
No. 2-A, 3-A Warner & Swasey.
No. 3 Cincinnati-Acme A. C. & B. F.
No. 4-A Warner & Swasey, 7¾" H. S.
No. 4-L Gisholt, 9¼" H. S.

HILL-CLARKE MACHINERY CO.
645 W. WASHINGTON BOULEVARD, CHICAGO

CHICAGO'S LARGEST STOCK OF ELECTRIC POWER EQUIPMENT**AIR COMPRESSORS**

CFM	Make	Lbs. Pressure	Type
2 2714	Ingersoll Rand	40	Belt driven
1 1220	Bury	30	Belt driven
1 1100	Bury	100	Belt driven
1 1084	Ingersoll Rand	35	Steam driven
1 840	Gardner Denver	125	Synchronous
3 573	Gardner Denver	55	Belt driven
1 571	Gardner Denver	100	Belt driven
1 368	Ingersoll Rand	100	Belt driven
1 340	Sullivan	100	Belt driven
1 317	Union	100	Steam driven

SPECIALS

- 1 17 KW Acme 18" throat spot welder.
- 1 50 HP Howell 1725 RPM high slip motor.
- 1 50 HP G. E. 600 RPM new vertical gearmotor.
- 1 40 HP G. E. 600 RPM new gearmotor.
- 1 1000 HP Falk 590/450 to 190/145 RPM reducer.
- 2 50 HP James 900/48 RPM speed reducers.
- 600, 300, 150, 100 KW synchronous M. G. sets
- 75, 200, 300, 500 Ampere arc welders.
- 3000 CFM and 4500 CFM G. E. 15 lbs. pressure turbine driven centrifugal air compressors.
- 2700, 3300, 3800 and 4500 CFM centrifugal air compressors, motor driven.

Chicago Electric Company,**1330 W. Cermak Road, Chicago****If Not In Stock We Can Locate It — Write Us****BAND SAWS**

Racine 14" ball bearing.
GRINDERS
 Gardner No. 6—26", b.b., m.d., disc.
 Landis No. 2—Universal, Cyl.
 Norton 10x50 Plain, Cyl.

LATHES

Seneca Falls 9"x4" semi g. c. g.
 Pratt & Whitney 16"x7", g. c. g.
 Sidney 15"x8" double back geared.
 Monarch 18"x8" grd. hd., m.d., q. c. g.
 Rockford 20"x10" h.d., d.b.g., q. c. g.

HACK SAWS

Racine Jr., Motor Driven, 4x4.
 Toledo 6x6.
 Peerless 6x6 (2).

TURRET LATHES

No. 2A, 3-A W. & S., univ. s. p. d.
 No. 6 Warner & S., semi-univ. c. d.

PRESSES

Toledo No. 3 and No. 4, o. b. i.
 Robinson No. 2 o. b. i.
 Swaine No. 35, o. b. i.
 Pexto No. 15 o. b. i.

SHAPERS

Rhodes 7".
 Kelley 16", B. G.
 Queen City 16", H. D., B. G.
 Cincinnati, 20", B. G., M. D.
 Cincinnati, 24", H. D., B. G.

MILLERS

Kearney & T. No. 1 1/2-B vert., s.p.d.
 Kearney & T. No. 1 1/2-B No. 1-B.
 No. 2-A, plain, dbl. overarm, s.p.d.
 Brown & Sharpe, No. 3-B, s.p.d.
 Kempsmith No. 1, plain, cone drive.

Midwest Equipment Company**128 S. CLINTON ST., MACHINE TOOL DIVISION CHICAGO, ILL.****SIMMONS SELECT OFFERINGS**

120"x120"x32' Niles-Bement-Pond Extra Heavy Duty Planer, motor drive, panel control, four heads.

16—26' Niles Extra Heavy Duty Vertical Boring and Turning Mill Extension Type, with floor plates and extra swiveling head, for large diameters, motor drive.

100" Gould & Eberhardt Horizontal Gear Hobber, motor drive, power rapid traverse, cuts gears 101" diameter, 48" face.

109"x50' Niles-Bement-Pond Heavy Duty Geared Head Lathe, motor drive, also motor for power rapid traverse to carriages.

500-Ton Niles-Bement-Pond Double Carwheel Press, motor drive.

48" Niles-Bement-Pond Crank Slotter, reversing motor drive.

40' Wickes Pyramid Type Horizontal Bending Rolls, motor drive, drop end housing, complete with motors.

We own these machines before we offer them.**OVER 2000 ADDITIONAL MACHINE TOOLS IN STOCK. WIRE OR WRITE.****SIMMONS MACHINE TOOL CORP.****Albany,
N. Y.****149 Broadway,
New York, N. Y.**

ARE YOU EQUIPPED FOR THE UPTURN?

Lathes

- 14"x8" Lodge & Shipley Grd. Hd. S.P.D. Taper.
 17"x12" LeBlond, three step cone drive.
 18"x14" Monarch Helical Grd. Hd. M.D.
 20"x8" American Grd. Hd. S.P.D.
 20"x10" American 3 S.C.D. D.B.G.
 20"x14" Hendey Cone, Taper.
 21"x8" LeBlond, three step cone drive.
 22"x12" L & S Grd. Hd.
 24"x12" American Cone H.D. Q.C.
 24"x12" Lodge & Shipley Cone, Q.C.
 24"x22" Bradford Cone, Taper.
 25"x12" LeBlond, three step cone drive.
 26"x14" Bridgeford Grd. Hd. S.P.D.
 30"x10" American, three step cone drive.
 30"x20" American 12 speed Grd. Hd. S.P.D.
 36"x12" L & Sel. Grd. Hd. Taper S.P.D.
 36"x24" L & S Sel. Grd. Hd. Taper S.P.D.
 42"x18" Bridgeford Grd. Hd. M.D.
 42"x20" American Grd. Hd. M.D.

Planers

- 24"x24"x6' & 8' Gray Planers.
 26"x26"x8' Cleveland Openside.
 30"x30"x16' Gray.
 36" Cincinnati Openside Planer Shaper, M.D.
 48"x48"x12" Liberty Openside Planer, Three Heads. Excellent.

Shapers

- 16", 20" 24" Gould & Eberhard Cone Drive.
 16", 20", 24", 28", 32", Gould & Eberhard S.P.D.
 20" Steptoe, Timken bearing.
 20" Columbia H.D. Cone.
 24" Smith & Mills S.P.D.

Radial & Drill Presses

- 21" Cincinnati Bickford tapping attachment.
 24" Cincinnati Bickford Tapping attachment.
 D.1 Colburn H.D. 20" four spindle Barnes.
 3" American sensitive Cone.
 3, 4 and 6" American Trip. Purp. Enclosed Hd.

Gear Cutters

- No. 1, 2, & 3 Adams Farwell Gear Hobbers.
 No. 6, 624 Fellows Gear Shapers.
 No. 12 Barber Colman Hobbers.
 6, 11" Gleason Revel Gear Generators.
 No. 6-60", 3-26", 4-36", 4-48" B & S Automatic.
 80" Pfauter Hobber.

Milling Machines

- No. 1 Knight Miller & Driller.
 24" Cincinnati Automatic Plain Like New.
 No. 33 Kempsmith Plain Production M.D.
 No. 3-48" Garvin Duplex M.D.
 No. 2 B & S Plain Miller.
 No. 2 Cincinnati Plain.
 No. 2A Milwaukee Plain Mfg. S.P.D.
 No. 2 Rockford Univ. cone.
 No. 24" Rockford Univ. Cone.
 No. 3 Cincinnati H.P. Univ. Div. Hd.
 No. 3 Kempsmith Univ. Cone.
 No. 4 Cincinnati Plain H.P. Cone.
 No. 4 Cincinnati Univ. H.P. Cone. Div. Hd.
 No. 4 Cincinnati H.P. Rect. O.A. S.P.D. Vert.

Grinders

- No. 13 B. & S. Univ. Tool & Cut.
 No. 3 Ohio Universal Tool & Cutter.
 No. 4 Oliver Drill Grinder M.D.
 No. 51 Oliver Drill Grinder M.D.
 No. 2 Brown & Sharpe Surface, Mg. Chuck.
 60" Blanchard M.D. Like new.

- 14" Pratt & Whitney b. b. Surface, Mag. Chuck.
 No. 78 Wilmarth & Morman Surf. Grdr., Belt.
 3" Pratt & Whitney Surface.
 30"x120" Landis Self Contained B.T. Drive.
 6x18", 10"x36", 12"x36" Landis Self Contained.
 12"x30" Bath Univ.
 No. 50, 55, 60, 65 Heald Internal.

Hammers

- No. 2 1/2 Mossberg & Granville Drop Hammer.
 50 lbs. Little Giant.
 No. 4B and 6N Nazel Air Hammers.

Tappers

- No. 1, No. 2, No. 2X, No. 2BG Garvin Autom.

Vertical Mills & Boring Mills

- 24" Bullard Rapid Production S.P.D.
 42" Colburn Rapid Trav.
 No. 2 B & S Vertical M.D.
 No. 5B Becker Vertical Miller.

Pipe & Bolt Machines

- 1", 2" Acme Class A Bolt Cone.
 2" Acme M.D.
 2", 2 1/2", 3" Landis Bolt Cone.
 2 1/2" Landis with Lead Screw.
 2" Landis Pipe.

Saws

- 6"x6" Peerless High Speed.
 6x6 Racine Belt; No. 7 Atkins 8x8.
 No. 2 Klemm Metal Band Saw.

Shears

- No. 1 Covington Plate Shear, 13'x 1/4" Arr. M.D.
 No. 9C Beloit Punch & Shear.
 No. 14EF Pels Bar, Angle & T Shear, M.D.
 No. 2 Bethlehem Rotary Slitting Shear.

Brakes

- No. 184 Chicago Steel Bending Brake Arr. M.D.
 8"x10 gauge.
 6"x 1/2" Capt. Dreis & Krump.

Riveters

- No. 1 1/2 B. 4A. 2A HD. High Speed Riveters.
 No. 80, 80B Grant Rotary Spinners.

Presses

- No. 5 Consolidated Open Back Incl. nable.
 No. 5 Bliss Double Crank, Grd. Press.
 1 1/2" Ferracute.
 K 15, 30 Ton Lucas Forcing.
 150 Caldwell Hydraulic Wheel Press.
 300 Ton Caldwell Hyd. Wheel Press.

Drills, Mult.

- No. 11, No. 12, No. 40 Natco 8 spindles.
 Foote Burt Mult. Spindle 32 spindles.

Turret Lathes

- 1 1/2" and 2" Acme Hand Screw Machines.
 No. 4 & 6 Warner & Swasey Plain, Bar Feed.
 No. 4 Gisholt Plain.
 26" Libby Grd. Hd. 7" hollow spindle.
 14"x19" Fay Automatic.
 No. 2A W. & S., Timken, Serial over 320,000.

Horizontal Mills

- 2 1/2" Bar Universal S.P.D.
 No. 1 Niles Horizontal Taper type.
 No. 1, 2, 4 Barrett Horizontal.
 No. 1 Rockford.

Miscellaneous

- Fisher Oil Groover.
 No. 11 Dwight State Marking Machine.
 No. 12, No. 13 Pratt & Whitney Profilers.

CINCINNATI MACHINERY & SUPPLY CO.

217 East Second Street

CINCINNATI, OHIO

PHILADELPHIA'S LARGEST DEALERS IN MACHINERY & EQUIPMENT

Angle shr., 6"x6"x1" L. & A., m. d.
Bolt cutter, 2" Landis belt drive.
Boring mill, 24" Bullard, rap. prod.
threading attachment.
Drill, D3 Colburn, 3" cap.
Drill, 20 spindle Natco, No. 2 taper,
motor drive.
Gear hobbess, 18" & 24" Gould & E.
Grinders, No. 3 Diamond, surface,
cap. 12"x48", motor drive.
Lathes, 14"x8" L. & S., g. h., t. a.
Lathe, 16"x10" South Bend, mtr. dr.

Lathes, 16"x10" L. & S., g. h., t. a.
Lathe, 30x24 New Haven, belt.
Lathe, 36"x16" Putnam, triple geared
quick change.
Lathe, 36"x26" Johnson, belt drive.
Lathe, turret, No. 1 B&S hand screw
machine, belt drive, lot of equip.
Lathe, turret, 3A Warner & Swasey
S. P. drive, cap. 34".
Miller, "D" Becker vertical, m. d.
throat 29", table 20"x96".
Miller, No. 2 Kempsmith, plain,
table 10"x45", belt drive.

Miller, No. 5 Cincinnati plain, table
76"x19", s. p. drive.
Pipe machines, 2, 4, 6, 8 and 12"
belt and motor drive.
Planer, 48"x48"x16" Pond, 4 heads,
belted motor.
Press, No. 41 Robinson, 36" bet. up,
geared stroke 2", weight 11,000 lbs.
Punch, 24" Rock River, motor dr.
8"x11".
Punch, No. 2 H. & J. horiz. cap.
1"x11".
Saw, 10"x10" Napier, metal band.
Shapers, 14, 16, 20 & 24" various makes

THE O'BRIEN MCHY. CO., 113 N. Third St., Philadelphia, Pa.

No. 18 BLISS, 1 1/2" stroke.
No. 2 ROCK'D, Roll Feeds, 2" str.
No. 19 BLISS, 2" stroke.
No. 19-C BLISS, 2" stroke.
No. 20 McCall, 2 1/2" stroke.
No. 4 ADRIANCE, 2" stroke.
No. 25 TORRIS-WOLD, 2" stroke.
No. 21 BLISS, 2" stroke.
No. 5 NIAGARA, 2" stroke.
No. 6 TOLEDO Grd. O. B., 3" str.
No. 114 STOLL Double Acting
Cam, 2" and 4" stroke.
No. DG4 FERRACUTE Geared,
5" Stroke, Double Acting.
No. 30 BLISS Arch Press, 2" stroke.

No. 41 TOLEDO Horn Press, MD.,
1 1/2" stroke.
No. 12 1/2 V & O Double Acting,
Dial Feed, O. B. I.
No. 50 TOLEDO Arch Press, 6" str.
No. 25 NIAGARA Arch Pr, 2" str.
No. 25 NIAGARA Arch Press,
open front, 2" stroke.
No. 54 TOLEDO Grd. S.S., 7" str.
No. 64 CONS. S. S., 8" str., plain.
No. 64 CONS. S. S., 4" str., plain.
No. 37 1/4 BLISS, grd. S. S., 5" str.
No. 5 1/4 AMERICAN CAN CO.
S. S., 30"x36" bed, 2" stroke,
12000 lbs.

No. 390 WEST Horn Press, 6" horn,
3" stroke, dies for corrugating bushel
baskets.
No. 20 JOHNSON O. B. I., strip
feed, bottle caps 3-die.
No. P3 FERRACUTE Back fly-
wheel, 1 1/2" stroke.
No. PG4 FERRACUTE geared
back flywheel, 2 1/2" stroke.
No. 3-BLISS, bk. flywh., 1 1/2" str.
No. 2-ERDLE Bk. flywh., 1" str.
No. 46 PERKINS Geared back fly-
wheel, 2" stroke.
No. 36 NIAGARA back flywheel.
No. 16 BLISS Horn Press 2" stroke.

FALK MILL SUPPLY CO., INC.

115 WARD STREET

-1-

ROCHESTER, N. Y.

JOHNSON'S BARGAINS

SPECIALS

Multiple punch Long & Allstatter size B.U. 185 ton, ram face 7' 11"x13", m. d., like new.
Brake, 10' for 3/4" Robinson Apron Brake, motor drive.
30"x144" Landis cylindrical grinder, single pulley drive.
No. 2 Kempsmith plain miller, like new.
26"x24" Putnam engine lathe, very good.
16" Whiting Pyramid bending rolls, 1/2", like new.

Air compressors, 30' to 2000'.
Bolt threader, 2 heads, National 1".
Boring mill, 36" King turret; 60" Colburn 2 heads.
Boring mill, 44" Niles, vertical, 2 heads.
Boring mill, 8-12" Betts, vertical.
Boring mill, horizontal 4 1/2" bar Betts knee type.
Boring mill, horizontal, Barrett, 6" bar.
Drill, radial, 4" Drees; 4" Bickford.
Drills, 25 various, upright.
Drills, Colburn D4.
Flanging machine, 1/2" McCabe.
Gear cutters, No. 1 and 3 Adams hobbess.
Grinder, Wood Bros. universal.
Grinder, 6x18" Ott; 10x14" Landis; 8x18" Mod.
Hammers, Drop, various sizes.
Hammers, 500 and 25 lb. Little Giant.
Hammer, 200 lb. and 75 lb. Bradley.
Hammer, steam 4000 to 250 lb.
Lathe, 18"x8" Boye & Emmes.
Lathes, 15, various sizes.

Lathes, turret, No. 3 and 7 univ. Bardons Olives.
Lathe, 36" H. S. & G., heavy duty.
Lathe, turret, No. 6 Woods, tilted.
Miller, No. 22 universal rebuilt.
Miller, Pratt & Whitney spline.
Miller, No. 4 Brown & Sharpe, plain.
Press, No. 2, 3 and 4 Marshalltown, o. b. i., new.
Presses, hydraulic up push 18" dia. piston 38x28
bolster and pump.
Punches and shears, structural all sizes.
Saw, No. 14 Higley.
Shaper, 16", 20" and 24".
Shear, 3" Niagara, 16 gauge.
Shears, squaring Niagara 6", 14 gauge.
Shears, 310 Niagara ring and circle 1/4".
Seamer, double Bliss No. 5.
200 electric motors and generators.
Gas oil, and steam engines.
1000 other tools available.

Wm. C. Johnson & Sons Machinery Co.
1211-1223 Hadley Street, ST. LOUIS, MO.

REBUILT AND GUARANTEED

AUTOMATICS

8" & 12" Bullard Multiautomatic.
10" Bullard Continumatic.
18" Gisholt Simplimatic.
14" Fay.
Nos. 454 & 654 New Britain.
Nos. 24, 35 & 34 New Britain.
Nos. 5A & 6A Potter & Johnston.
41 bar machines from 3/4" to 3 1/4" B & S. Cone, Gridley, National Acme, etc.

BROACHES

Footo Burt vertical surface.
No. 28 Lapointe hydraulic.
10 ton Metalwood hydraulic.
15 ton Oilgear hydraulic.
No. 3 Oilgear hydraulic.
No. 3 American rack.
No. 3 J. N. Lapointe double.
Nos. 0, 3, 4 Lapointe.
2 ton American vertical.

COMPRESSORS

Several from 25" to 92".
106", 7 1/2"x6" Chicago, NSB.
120", 8"x6" Inger, Rand, ERI.
136", 8"x8" Ing. Rand, ERI.
173", 9"x8" Ing. Rand, ERI.
184", 9"x10" Gardner Dix.
255", 9 1/2"x12" Worthington.
355", 12"x10" Ing. Rand, ERI.
369", 12"x10" Chicago, NSB.
446", 14"x9"x10" Bury, 2-stg.
550", National type 3VD.
709", 17"x9 3/4"x12" Sullivan

WJ3, angle compound.

DIAMOND BORERS

Excello two spindle.
Coulter 1 & 2 spindle vertical, motor in base.

DRILLS

21", 24" & 28" Cincinnati.
20", 22", 24" Barnes all geared.
24" Barnes 4 spl. all grd.
30" Snyder.
Nos. 216, 217, 315, 321 Baker.
No. 2 Mfg. Colburn 1, 2, 3, 4 spld.

Natro multiple, Nos. 11, 12, C12, 13, C13, 14, B14 & 30.
Nos. 1 & 3 Bausch multiple.
No. 1 Pratt & Whitney gun.
6 spld. Pratt & Whitney deep hole.

Nos. 6D, 11D & 16D Moline.
No. 10D Moline cylinder borer.
5 spld. Detroit automatic.

Nos. 15 1/2 & 17 Foote Burt.
2 1/2 Morris radial.

3 American sensitive radial.
3 Drees radial.
3 Cint. Bick. radial.

3 1/2", 4", 5" & 6" Western radial.

4 Mueller radial.
4 Hammond radial.
6 N.B.P. univ. radial.

Sensitive:—Aver, Leland Gifford, Allen, L. G., H. & W., etc., 1 to 6 spindles, sizes No. 1 to No. 3.

FORGING TOOLS

No. 25 W. & W. bulldozer.
No. 5 I Nazel hammer.
No. 1A Ajax forge rolls.
1", 1 1/2" & 4" Ajax upsetters.
1 1/2" Acme upsetter.
1 1/2" No. 3 W. F. cold hender.

GEAR CUTTERS

Nos. 6 & 715 Fellows.
No. 12 Barber Colman.
Nos. 18H & 24H G. & E.
Nos. 1 & 5A Lees Bradner.
28" G. & E. spur & bevel.
30"x10" Newark automatic.
Nos. 3 & 4 B. & S. auto.
6" & 11" Gleason bevel.
Lipe 2-spld. chamferer.
Gleason quenching press.
No. 2 Bilton gear miller.

GRINDERS

No. 2 Cincinnati centerless.
No. 2 Helm centerless.
No. 72A3 Heald Sizenmatic.
Nos. 70 & 72 Heald internal.
No. 12 Bryant internal.
No. 3 Barber Colman hob.
10"x32" Norton crank.
16"x48" Landis crank.
No. 4 Brown & Sharpe univ.
No. 1 Bath universal.
No. 16 Blanchard surface.
6"x36" Norton surface.
8"x20" Wil. & Mor. surface.
12"x48" Springfield surface.
20"x50" Safety Emery surf.
30"x72" Springfield surface.
30"x84" Diamond face.
18", 24" & 30" Gardner disc.
Nos. 8, 220 & 221 Badger disc.
24", No. 84 Gardner opp. disc.
30", No. 96 Gardner hydr. face.
8" Arter auto. piston ring.
12" Arter rotary surface.
Landis:—6"x18" to 16"x53".
Norton:—6"x32" to 14"x72".

ENGINE LATHES

14"x6" & 16"x6" Monarch.
14"x6" American grd. hd., T. A.
16"x8" & 16"x10" Lodge & Shipley geared head.
18"x6" & 20"x8" Hendey, taper & relieving auto. m't.
21"x18" Leblond heavy duty.
22"x10" Davis.
20"x12" Wickes.

LATHES, TURRET

Nos. 2, 2A, 3A, 4 & 6 W. & S.
Nos. 1B, 3 & 4 Foster.
18" Libby.
21" & 24" Gisholt.
24" & 42" Bullard vertical.

LATHES, MFG.

8" Sundstrand stub.
11"x4", 11"x6", 17"x6" Leblond.
17"x8", 20"x8" Wickes.
13"x6" Automatic threading.
20"x10" Leblond crankshaft.
Nos. 9 & 12 Leblond Multicut.

MILLERS

Nos. 1 1/2, 2, 3 & 4 Cincinnati.
Nos. 1 1/2, 2 hvy., 3B & 4B B&S.
No. 1 1/2 Rockford univ.
No. 2 Brown & Sharpe vert.
No. 6 Liecker vertical.
24" Cincinnati duplex.
24" & 48" Cincinnati automatic.
24", 48", 54" & 60" Newton rot.
48" Ohio tilted offset.
Nos. 13B & 33 B. & S. Mfg.
No. 3 Sundstrand Rigidmill.
No. 4—36 Cincinnati Hydromatic.

BORING MILLS

24" Bullard, side head.
30" Bullard, single turret.
34" Colburn single turret.
36" Niles car wheel.
42" Bullard with side head.
42" King, 1 pl. & 1 turret hd.
42" Detrick & Harvey.
60" Gisholt.
3" Binsee horizontal.

PLANERS

24" Cincinnati crank.
30"x30"x12" Cleveland openside.
32"x32"x12" Niles.
36"x36"x16" Cleveland openside.
48"x36"x10" Liberty openside.

PRESSES

No. 51 Cleveland OBI.
Nos. 5 & 6 Consolidated OBI.
Nos. 5 grd. Toledo OBI.
No. 4 Rockford OBI.
Nos. 75 grd. Toledo openback.
No. 1 1/2 Bliss toggle draw.
No. 266 Consol. cam draw.
No. DDG 54 Ferracute cam.
600 ton Cleveland coining.
250 ton Ferracute coining.
Nos. 55 1/2, 56, 56 1/2, 58 Toledo.
Nos. 62, 64, 65, 66 Consolidated.
No. PG 4 Ferracute.
No. 41 & 41A Toledo horn.
72" No. 3G Bliss dbl. cr.
No. 7 Z. & H. percussion.
Nos. 23 & 25 1/2 Consol. horn.
No. 176A Consol. gap dbl. cr.
No. 60D50 Cleveland dbl. cr.

RIVETERS

High Speed:—Nos. 1 1/2B, 2A, 3A, 4A, 5A, 6B & 7B.
20 & 50 ton Allen air.

SAWS

6"x6", 8"x8" & 12"x13" Racine.
6"x6" Peerless shaping.
23" Newton cold saw.

SHEET METAL TOOLS

4"x 1/2" Niagara shear.
10"x16 ga. Bertsch shear.
No. 1 Gray metal cutter.
Nos. 1 & 2 Campbell nibblers.
48" McKay roller leveler.
3/4" & 1/2" Shuster straighteners.
Nos. 1 & 2 Pettigall hammers.
1 1/4"x 3/4" Bertsch angle roll.
Spot welders, 7 to 100 k.v.a.

2000 Tools in Stock. Send for List.

MILES MACHINERY CO.

SAGINAW, MICHIGAN

Automatic and Hand Screw Machines

- 10—No. 00 Brown & Sharpe Automatics
- 10—No. 0 Brown & Sharpe Automatics
- 10—No. 2 Brown & Sharpe Automatics
- 2—No. 0 Brown & Sharpe Hand Screw Machines
- 2—No. 1 Brown & Sharpe Hand Screw Machines
- 1—No. 2 Brown & Sharpe Hand Screw Machine

REYNOLDS MACHINERY,

171 PINE STREET,
PROVIDENCE, R. I.

OTT MACHINERY SPECIALS

AUTOMATICS, Cleveland Model A, $\frac{3}{4}$ to 4 $\frac{1}{2}$ ".
Gridley 4 spindle Model F, 1 $\frac{1}{2}$ " and 2 $\frac{1}{2}$ ".
Threading Lathes, Coulter 13"x6".
BORING MILLS, Landis 3" Bar, 24"x50" Table.
Bullard 24" Rapid Production.
DRILLS, Mueller Plain Radial, 4', Motor Drive.
Western Plain Radial, 3' & 5' Motor Drive.
GEAR HOBBS, Barber-Colman Nos. 3 and 12.
Lees-Bradner Nos. 1 and 5A.
GEAR SHAPERS, Fellows Nos. 6, 61 and 7.
GRINDERS, Heald Nos. 85, 65, 70, and 75

Norton Plain, 6"x32", 10"x36", 14"x50" & 72".
Landis 10"x52" Plain, S. C.
B. & S. No. 11 & 14 Plain, S. C.

LATHES, American 16"x6", GH, QC, TA, MD.
Springfield Ideal 18"x8" T. A., M. D.
Niles, B. & P., 36"x10", Triple Geared, MD.
Warner & Swasey No. 2-A Univ. Geared Head.
MILLING MCHS, B. & S. No. 2B Hvy. Pl. SPD
Van Norman No. 2 Duplex, Sub-Head, M. D.
Hall Planetary Thread Mill, M. D.
Ingersoll 36"x8" Open Side, Adj. Rail, M. D.
PRESSES, Ass't'd. O.B.I. to large T. ggles.

AND MANY MORE GOOD TOOLS

OTT MACHINERY SALES, Inc., 548 Second Ave., DETROIT, MICHIGAN

VERTICAL BORING MILLS

- 100" Niles-Bement Pond; 2 swivel heads; Power Rapid Traverse; Motor Drive.
- 60" Gisholt; 2 swivel heads; Power Rapid Traverse; Motor Drive.
- 48" Colburn, 2 swivel heads, S. P. D.
- 42" Bullard, 2 swivel heads, S. P. D., P. R. T.
- 36" Bullard, 2 swivel heads, Belt Drive.

VERTICAL TURRET LATHES

- 24", 36", 42" Bullard New Era Type.

HORIZONTAL BORING MILLS

- No. 31 Lucas, 3" bar, S. P. D.

LATHES

- 60"x22" Putnam, B. D.; with raising blocks to swing 80".
- 30"x17" Houston, Stanwood & Gamble, Belt Drive.
- 28"x20" Walcott, Belt Drive.
- 24"x12" American Geared Head, M. D.
- 12"x8" L. & S. Belt Drive, Taper Aft. Collets.
- 16"x7" Reed Prentice, M. D.

GRINDERS

- No. 2 Cincinnati Centriless — Model H; Motor Drive.
- No. 3-V Galmeyer & Livingston Vertical Spindle Surface; Magnetic Chuck; Motor Drive.
- No. 3 Wilmarth & Morman Surface.
- No. 65 Heald Internal.
- No. 3 Bryant Internal.
- No. 14 Gardner Disc, Ball-Bearing.
- No. 1 Fraser Universal Tool and Cutter.

AUTOMATIC SCREW MACHINES

- 27" & 28" Gridley Model "G" 4-spindle.
- 14" Cone 4-spindle.
- No. 2 Brown & Sharpe.

MILLING MACHINES

- No. 2 Cincinnati High Power Plain; Power Rapid Traverse; Motor Drive.
- No. 2-B Brown & Sharpe Plain, Motor Drive.
- No. 2YB Brown & Sharpe Plain, Motor-in-Base.
- No. 3, 2 Cincinnati Plain; Cone Drive.
- No. 15 Garvin Vertical.
- No. 2 Kempsmith Universal, Belt Drive.
- No. 4 Brown & Sharpe Plain, Belt Drive.
- 4" Pratt & Whitney Spline.

TURRET LATHES

- No. 2A Warner & Swasey Hollow Hexagon Universal; Chucking equipment.
- 26" Libby, 7 $\frac{1}{2}$ " hollow spindle, Motor Drive.
- 28" Libby, 4 $\frac{1}{2}$ " hollow spindle, Motor Drive.
- No. 5 Foster Geared Head, 2 $\frac{1}{2}$ " hollow spindle, S. P. D.
- 3"x36" J. & L., with Bar & Chucking Equip., S. P. D.

RADIAL DRILLS

- 7" American Triple Purpose, M. D. thru gear box.
- 6" Cincinnati Bickford, Motor Drive.

SHAPERS

- 25" Smith & Mills, Motor Drive.
- 10" Pratt & Whitney Vertical, Belt Drive.
- 6" Pratt & Whitney, Vertical, Motor Drive.

MISCELLANEOUS

- Drill Press, 4-spindle Edlund Hall Bearing, M. D.
- Hammer, 308-lb. Bradley Upright Helve.
- Oil Groover, Fischer, Motor Drive.
- Planer, 14' x10' x20" Niles; 4 heads; M. D.
- Press, 50-ton Lucas Forcing.
- Shear, No. 642 Niagara Squaring, capacity, 10 ga., cutting length 64", 15" gap, Motor Drive.
- Slotter, 48" Niles.

SUN MACHINERY COMPANY

36 Van Vechten St.,
NEWARK, N. J.

LIQUIDATING LARGE PRESSES

ALL MACHINES CAN BE INSPECTED UNDER POWER IN PRIVATE PLANT

PRESSES, straight side, tie-rod fr.
No. 59 $\frac{1}{4}$ Toledo, m. d., air cush.
No. 59 $\frac{3}{4}$ Toledo, m. d., air cush.
No. 310 Bliss, m. d., air cushion.
No. 58 Toledo
No. 305 Bliss, 8" stroke

PRESSES, double crank
No. 94 $\frac{1}{2}$ -E Toledo, m. d., air cush.
No. 95-E Toledo, air cushions, m. d.
No. 8 Bliss, 120" bet. hsgs., air cush.
No. 104 Bliss, gap frame
No. 24-E Bliss, gap frame
No. 23-J Bliss, overh. gap fr., 6" str.
No. 7-F Bliss, 96" between uprights
Niagara No. 615, 62" between upr.
No. 848 $\frac{1}{4}$ Hamilton, m. d., 84" bet.
No. 92-B Toledo. 12" stroke

Logeman hyd. scrap baler, complete, 32"x19"x72"
No. 96-G Toledo, 149" bet. uprights.
24" str., tie-rod, wt. 162 000 lbs.
Hyd. Watson S., 200 ton, 2-10" rams

PRESSES, toggle
No. 408-B Bliss, 84" bet. upr., 58x84 bed, tie-rod
No. 268 $\frac{1}{4}$ -C Toledo, 108" bet. upr.
No. 795 $\frac{1}{2}$ -A Toledo, 72" bet. upr.
No. 166 Toledo, No. 3 $\frac{1}{2}$ -B Bliss

PRESSES, OBI
8-No. 6A Bliss, b. g., m. d.

PRESSES, horn
No. 26 Bliss
No. 24 Bliss, swinging table

PRESS BRAKE, 10' 3/8" Chicago Steel, 12' on bend. ng die, m. d.

OTHER DESIRABLE TOOLS

SHEAR, 13' 1/4" Hyde Park, 15' gap

\$1450

Angle Iron Shears, Coving., 6x4x $\frac{1}{2}$ ", dbl. end.
Automatics, Brown & Sharpe, late serial
No. 00G—serial No. 9900; No. 00—serial
No. 9800; No. 0G over 6700; No. 2.

Baling press, Galland & Henning, No. 10—
M.C., with triplex pump, operating valve.

Bending roll, 12", $\frac{7}{8}$ " cap., drop end.

Bending Roll, 10' 3/8" H. & J.

Boring mills, 36" Bullard New Era, with side
head, late serial numbers (2).

Boring mill, hor. 4 $\frac{1}{2}$ " bar, m. d., rotary table.

Boring mill, 88" vertical.

Brakes, box & pan, 5 & 6' Chicago Steel.

Brakes, hand, 10' 14—8' 16, 8' 12.

Apron brake, 12' 1 1/4", Chgo. St., pwr. clamp.

Brakes, power, Chgo. Steel 10' 3/16"; 10' 10
ga.; 8" 1/4"; 6" 12 ga.

Bulldozer, Rock River Crosshead 32x5 $\frac{1}{2}$ ".

Drill, No. 242 Barnes Camer Back.

Drill, 6 spindle Edlund, power feed.

Gang Slitter, 36" Yoder, m. d., levelling rolls.

Grinder, No. 25 Heald Surf. 16" mag. chk.

Grinder, Blanchard surf. 30" mag. chuck.

Grinder, No. 2B & S. surf., m. d., mag. chk.

Hammer, drop, 400 lb. Standard.

Hammer, No. 2A, No. 5A Hi-Speed.

Hand millers, No. 2 Kent Owens (4).

Ironworker, Univ., Schatz, 6x6 ang., 3x3 Smith.

Lathes, 30"x16" L&S, t.a., 26" Bradford.

Lathe, 36"x30" L. & S., 24" centers, q.-g.

Lathe, 48"x18 Schumacher & Boye.

Lathes, spin., Prybil 22", bb.; Tol. 30" bb.

Lathes, Tool Room, 14x6 L. & S.; 18x8 South
Bend, m. d.; 22"x12" American.

Millers, Pl. & Vert., No. 3 Inger. 14x48 tbl.

Millers, Pl., No. 3B No. 1A K. & T., dbl. over.

Millers, planer type, 36"x168" Ingersoll.

Millers, Univ., No. 2A B. & S., div. hd., m. d.

Miller, No. 3 Cin.-high pwr., vert. hd., div. hd.

Nibblers, Campbell No. 1 & 1B, m. d.; No. 2.

Planer, 26"x8' Cleveland, openside.

Planer, 60x60x18 N. B. P., 4 hds., m. d.

Planer, 36"x12' Liberty, box table, m. d., 2 hds

on rail, 1 side head.

Porcelain Vitreous Enameling Furnace.

Press Brake, 10' 10 ga. OHL, excel. condition.

Press, coining, 600 ton Waterbury-Farrel.

Saw, Friction, No. 1, No. 0 Ryerson.

Radial drill, 5' American, triple purpose.

Radial Drill, 6' American, 5' Fossick.

Roller leveller, 67" wide 4 $\frac{1}{2}$ " dia. rolls, m. d.

Roller leveller, 48", 17 rolls, motor drive.

Saws, hack, 6x6", 9x9" Peerless.

Screw machine, model M, 4 sp., Cleveland.

Screw Mch., auto., No. 506 New Brit. 6 sp.

Shapers, 20" Queen City; 16" & 24" Milwa-

kee; 16" & 24" Gould & Eberhardt.

Shaper, 24" Ohio Dreadnaught, tilt top tbl.

Shear, 16' 3/16", Long & Allstatter.

Shear, power, 10' 3/8", 10' 3/8" Ohl.

Shears, power, 13', 3/8" Bertsch, with hold-

down, m. d., 13', 3/8" 5' 1/8" Bertsch; 6' 10 ga.

Stoll, 24" gap, 10' 10 ga.

Turret lathe, No. 4A & 2A W. & S. Univ.

INTERSTATE
Machinery Co., Inc.



Office and Show Room, 109 S. Clinton St., Chicago, Illinois.

WORLD'S ONLY PROPELLER REAMER SPECIALISTS—

We carry listed sizes on hand. Standard— $\frac{3}{4}$ " taper per foot.

Specify finishing spiral flute or roughing straight flute.

No. 0— $\frac{1}{8}$ " at small end to 1" at large end. Length overall, 12"	\$ 7.95
No. 1— $\frac{3}{8}$ " at small end to 1 $\frac{1}{2}$ " at large end. Length overall, 16 $\frac{1}{2}$ "	10.85
No. 2—1 $\frac{1}{4}$ " at small end to 2" at large end. Length overall, 18"	16.50
No. 3—1 $\frac{1}{2}$ " at small end to 2 $\frac{1}{2}$ " at large end. Length overall, 20 $\frac{1}{2}$ "	22.50

Shank of No. 0 has No. 2 Morse taper. No. 1 has No. 3 Morse taper.

No. 2 and 3 have No. 4 Morse taper.

Are you interested in our keyway cutting feature? Send for catalog.

Our 1938 money saving small tool catalog is just out. Send for your copy.

TRAVERS TOOL COMPANY, 5 Court Square, Long Island City, N. Y.

NORTON — CINCINNATI

- No. 4 LeBlond Universal Miller with 12" Dividing Head, Cone Drive.
- No. "I-B" K. & T. Double Overarm Miller, Motor Drive with A. C. Motor.
- No. 3, 4 & 5 Cincinnati, Brown & Sharpe & LeBlond Millers.
- No. 3-A Warner & Swasey Turret Lathe, Bar Feed Serial No. 248236.
- No. 3 Cincinnati 12"x48" Universal Grinder, Motor Drive.
- No. 1 Diamond Surface Grinder, Magnetic Chuck.
- 14" Pratt & Whitney Vertical Grinder, Motor Drive, Magnetic Chuck.
- 16"x8" Lodge & Shipley Geared Head Lathe.
- 30"x10" D. & K. Open Side Planer, 1-Head, Old Style.
- No. 175-A Consolidated Double Crank Inclined Motor Drive Press, 42" Between Uprights.
- 42"—60"—144" Vertical Boring Mills.
- 8"x10 ga. D. & K. Leaf Type Pan Brake 8" Fingers, Belt Drive.
- 12"x12 ga. Toledo Squaring Shear, Motor Base.
- 6" American Radial (Not enc. head).

The Norton-Broadway Machinery Co., 610 BAYMILLER ST. CINCINNATI, O.

"READY TO SHIP"

- 1—BLANCHARD No. 16 Grinder, 26" chuck, belt drive.
- 1—BROWN & SHARPE No. 13 Universal Grinder, belt drive.
- 1—BROWN & SHARPE No. 4 Universal Cylindrical Grinder, belt drive.
- 1—NORTON 3"x18" Plain Cylindrical Grinder, Self-Contained, Single Pulley Drive.
- 1—ABRASIVE No. 3 Surface Grinder, chuck and generator.
- 2—BROWN & SHARPE No. 2 YB Plain Millers, A. C. Motor Drive.
- 2—BROWN & SHARPE No. 2 B Heavy Plain Millers, A. C. Motor Drive.
- 1—CINCINNATI No. 3 Plain Miller, Rectangular Over arm, Motor in Base.
- 2—CINCINNATI No. 3 Plain Millers, High Power, Large Pulley. All Feeds, Single Pulley Drive
- 1—CINCINNATI No. 4 Plain Miller. Dividing and Vertical Heads, C. D.—Q. C. Feeds.
- 1—CINCINNATI No. 4 Plain Miller, Rectangular Over arm, Motor Drive.
- 1—SHUSTER Wire Straightener, $\frac{3}{8}$ "x10" capacity.
- 1—LODGE & SHIPLEY Lathe 20"x10" geared head, motor drive or single pulley.
- 1—16" CINCINNATI Gear Hobber, Single Pulley Drive.
- 1—REED PRENTICE 5" Radial, Motor Drive.
- 1—PRATT & WHITNEY No. 13 Multiple Spindle Drill Press, rectangular head.
- 1—GOULD & EBERHARDT 24" Cone Drive Crank Shaper.
- 1—60"x48"x12" NILES BEMENT POND Planer, 2 Heads, 1 Side Head, Belt or Motor.
- 10—No. 18S BLISS Bench Presses, Roller Clutches.

Other just as desirable tools in our large stock. Your inquiries requested.

MORRIS MACHINERY COMPANY, INC.

97 Chestnut Street

Newark, N. J.

EMCO REBUILT MACHINE TOOLS

BORING MILLS

- 30" Gisholt, 1 head, belt.
- 36" Bullard Rapid Production, 2 heads, s.p.d.
- 37" Niles, 2 heads, m.l.
- 40" King, 2 heads, p.r.t., belt.
- 42" Bullard Rapid Production, 2 heads, s.p.d.
- 42" King, 2 heads, m.d., p.r.t.
- 48" Niles-Bement-Pond Car Wheel Borer, belt.
- 60" Gisholt, 2 heads, p.r.t., M.D. A.C. motor.
- 60" Gisholt, 2 heads, p.r.t., variable speed D.C.
- 72" Niles, 2 heads, cone.
- 72" Bullard, 2 heads, cone.

SHAPERS

- 15" Potter & Johnston Universal, m.d.
- 16" Cincinnati, m.d.
- 16" Smith & Mills, cone.
- 20" Queen City, cone.
- 20" Smith & Mills, cone.
- 24" Gould & Eberhardt, m.d., universal table.
- 24" Stockbridge, m.d.

TURRET, LATHES, MFG. LATHES

- Gisholt Simplicatic, m.d.
- 2x24" Jones & Lamson 2 spindle, m.d.
- 3x36" Jones & Lamson 2 spindle, m.d.
- 3x36" Jones & Lamson 1 spindle, m.d.
- 34x36" Cincinnati Acme Flat Turret, m.d.
- 34" Gridley S.S. Automatic, belt.
- 14" Fay Automatic, s.p.d.
- 18" Libby Type A Turret Lathe, m.d.
- 20" Acme Turret Lathe, cone.
- 21" Gisholt Turret Lathe, cone.
- 24" Gisholt Turret Lathe, m.d.
- No. 0, 1, 2, 3, 4 Foster Turret Lathes.
- No. 2F Foster Fastermatic, m.d.
- No. 2, 4, 6 Warner & Swasey Turrets, cone.
- No. 2A, 3A Warner & Swasey Universals, m.d.
- No. 2A W. & S. Univ., Tim. Br., m.d., very late
- No. 4, 7 Bardons & Oliver Turrets, cone.
- No. 5A, 6A Potter & Johnston Automatics, m.d.
- No. 6C Potter & Johnston Automatic, s.p.d.
- No. 6D Potter & Johnston Automatic, m.d.
- No. 54 National Acme 4 spindle Automatic, belt.
- No. 5 Niles-Bement-Pond Center Driv. Car Wh. Lathe, m.d., size 42x96", brand new.
- No. 6, 9 LeBlond Multi-Cut Lathes, s.p.d.
- No. 12 LeBlond H.D. Auto. Crank. Lathe, m.d.
- No. 14C H.D. LeBlond Auto. Crank. Lathe, m.d.
- 34x60" LoSwing Lathe, m.d.

GEAR MACHINERY

- No. 34, 44 Brown & Sharpe Gear Hobbers, m.d.
- 11" Gleason Straight Tooth Rev. Gear Gen., belt.
- 12" Gleason Auto. Gear Planer, cone.
- 16" Cincln. Gear Holder, m.d., rect. overarm.
- No. 3, 12 Barber-Colman Gear Hobbers, belt.
- No. 12 B.-C. Gear Hobbers, dble. overarm, m.d.
- No. 3-26" and 3-36" Brown & Sharpe Gear Cut.
- No. 3-26" Cincinnati Gear Cutter, belt.
- No. 5A Lees-Bradner Gear Generator, 14" size.
- No. 6 Fellows Gear Shaper, belt.
- No. 645 Fellows Helical Gear Shaper, m.d.
- No. 7 Fellows H.S. Gear Shaper, m.d.
- No. 16HS Gould & Eberhardt Gr. Hob., type C, s.p.d.
- No. 18HM 2 spdl. G. & E. Gear Hobber, m.d.
- Schuchardt & Schutte Gear Tooth Rounder, belt.

GRINDERS

- No. 2 Brown & Sharpe Auto. Surface, belt.
- No. 2F Norton Lapper, m.d.
- No. 10U Norton Lapper, m.d., latest type.
- No. 3 Brown & Sharpe Planer Type, belt.
- No. 3 Wilmarth & Morman Auto. Surface, belt.
- No. 33 Abrasive Vert. Surface, m.d. in base.
- 6x10x36" Norton Type G Surface Grinder, m.d.
- 12x36" Diamond Automatic Surface, m.d.
- 14" Pratt & Whitney Vertical Surface, m.d.
- 18x48" Diamond Light Duty Face, m.d.
- 30x84" Dia. Hvy. Duty Face, m.d. 90" mag. chk.
- No. 50, 55, 60, 65 Heald Cylinder, belt.
- 6x18" 10x24" 10x36" 10x52" 10x72" 12x52" 12x72" 16x32" 16x52" Landis Plain Self-Contained Cylindrical, m.d.
- 20x144" Landis Pl. Self-Cont. Cylindrical, m.d.
- No. 11 - 6x32" Brown & Sharpe Plain Cyl., m.d.
- 6x32" 10x36" 10x50" 10x72" 12x72" 16x36" 18x96" Norton Pl. Cylindrical Grinders, belt.
- 8x30" Norton Plain Cylindrical, m.d.
- 10x18" No. 14 Brown & Sharpe Plain Cyl.
- 10x36" Landis Integral Cam Grinder, m.d.
- 10x72" Norton Plain Cylindrical, m.d.
- 12x18" Cin. Pl. Self-Cont. Cyl., 3 motor drive.
- No. 4 Gardner B.B. Disc.
- No. 6 Diamond Disc, belt.
- No. 20 Gardner B.B. Comb. Disc, m.d.
- No. 24 - 53" Gardner B.B. Horizontal Disc, m.d.
- No. 3 Bryant Semi-Automatic Hole, m.d.
- No. 11 Giddings & Lewis Teromatic, m.d.
- No. 15A Bryant Semi-Auto. 2 sp. Hole & Face, m.d.
- No. 1 Wilmarth & Morman Universal, belt.
- No. 2 Cincinnati 12x36" Universal, belt.
- No. 3 Brown & Sharpe 12x40" Universal, belt.
- No. 4 Landis Universal, belt.
- 18" Cincinnati Face Mill Grinder, m.d.
- No. 1 LeBlond Univ. Tool & Cut. Grinder, belt.
- No. 1 Norton Universal Tool & Cutter, belt.
- No. 1 1/2 Cincinnati Univ. Tool & Cutter, belt.
- No. 2, 4, 5, 41 Oliver, m.d. Drill Pointers, m.d.
- Sellers 3" Drill Grinder, m.d.
- Gleason Cutter Grinder, belt.

MILLING MACHINES

- No. 4 Kempsmith Plain MaxiMill, m.d. in base, ball bearings, Nat. Stand. Spindle, very late.
- No. 2, 3, 4 Cincinnati Pl., s.p.d., flanged spdl.
- No. 1 1/2, 2, 3, 4, 5 Cincinnati Plain, cone.
- No. 1, 2 Cleveland Plain, s.p.d.
- No. 3 Kempsmith Plain, cone.
- No. 13B Brown & Sharpe Plain, s.p.d., national Standard Spindle, like new.
- No. 2 Rockford Universal, s.p.d.
- No. 2 Brown & Sharpe Universal, cone.
- No. 4B, 5, 6 Becker Vertical, cone.
- No. 4 Cincinnati Vertical, m.d., flanged spdl.
- C66A Newton 3 spindle Continuous, m.d., 48" dia. table.
- Becker Vertical Continuous, cone.
- 6x90" Pratt & Whitney Thread, m.d.
- 24" Cincinnati Plain Automatic, m.d., National Standard Spindle.
- 24" Cincinnati Duplex Automatic, m.d.
- 24" Cincinnati Duplex Automatic, belt.
- 28" Cincinnati Semi-Automatic Duplex, belt.
- 48" Cincinnati Worm Driven Plain Auto., s.p.d.
- 48" Oesterlein Tilted Offset, m.d., Nat. Stand. Spindle, Timken Bearings, latest type.
- No. 33 Kempsmith Production, s.p.d.

Write For Complete Stock List

THE EASTERN MACHINERY CO.

1000 Tennessee Avenue

Cincinnati, Ohio



21x14x5½—16 gauge

25,000

Used One Piece Steel Tapered

TOTE PANS**50¢ each****PASSMAN BROTHERS****705 W. Washington Blvd.,****CHICAGO, ILL.****3 OUTSTANDING BARGAINS**

4th HEAVY DUTY SWIVEL BASE STATIONARY JAW SEMI-STEEL BODY MACHINIST VISES. List Price \$17.00. **OUR PRICE \$10.50, NET.**

5th 4 JAW UNIVERSAL LATHE CHUCKS WITH TWO SETS OF JAWS. REGULAR DUTY TYPE. List Price \$60.00. **OUR PRICE \$17.00.**

5th 3 JAW COMBINATION LATHE CHUCKS WITH REVERSIBLE JAWS. HEAVY DUTY TYPE. List Price \$80.00. **OUR PRICE \$20.00.**

ALL TOOLS NEW AND FIRST QUALITY IN EVERY RESPECT—OF GOOD DOMESTIC MAKE.

SEND YOUR ORDERS IN WHILE OUR STOCK LASTS.

DE WITT TOOL COMPANY**173 GRAND ST. NEW YORK CITY, N.Y.**

SEND FOR OUR LISTS OF OTHER BARGAINS

EXTRUDING PRESS

Bliss No. 308. Built new in 1929. 30" between uprights; 6" stroke. 26½" die space. Timken bearing and equipped with herringbone gears. Original cost \$11,000. Press used only a few months.

PRICE \$ 6500.

Other presses available.

BRADLEY MACHINERY CO.**529 E. JEFFERSON DETROIT, MICH.****FOR SALE**

8—No. 2 Brown & Sharpe Full Automatic Screw Machines.

4—No. 0 Brown & Sharpe Full Automatic Screw Machines.

1—No. 00 Brown & Sharpe Full Automatic Screw Machine.

2—No. 2 Brown & Sharpe Forming Machines.

1—No. 00 Brown & Sharpe Forming Machine.

*All machines are fully equipped and in excellent condition.**Prices are reasonable!***Broadway Machinery Co., Inc.****211 Centre Street,****New York, N. Y.**

VICTOR'S BARGAINS IN SMALL TOOLS

We have just purchased 1000 Johansson Adjustable Snap Gages, Slightly Used. **\$2.75** Ea.
We are offering These Snap Gages at

In any of the sizes
listed below:



0 to $\frac{1}{4}$
 $\frac{1}{4}$ to $\frac{1}{2}$
 $\frac{1}{2}$ to $\frac{3}{4}$
 $\frac{3}{4}$ to 1
1 to $1\frac{1}{4}$
 $1\frac{1}{4}$ to $1\frac{1}{2}$
 $1\frac{1}{2}$ to 2
2 to $2\frac{1}{2}$
 $2\frac{1}{2}$ to 3
3 to $3\frac{1}{2}$
 $3\frac{1}{2}$ to 4
4 to $4\frac{1}{2}$
 $4\frac{1}{2}$ to 5
5 to $5\frac{1}{2}$
 $5\frac{1}{2}$ to 6

We will send these snap gages on approval.

Send For Our General Catalogue

Victor Machinery Exchange, Inc.

251 Centre Street,

New York, N. Y.

**NEW! 5000—MOTORS—5000 NEW!**

1800 r. p. m. Single and 3-phase A. C. Ball Bearing
 3 phase 60 cycle 220/440 volt 1 h. p. \$25.00 1½ h. p. \$31.00
 2 h. p. \$36.00 3 h. p. \$40.00 5 h. p. \$48.00 7½ h. p. \$64.00
 10 h. p. \$80.00 15 h. p. \$95.00 20 h. p. \$110.00
 110/220—60 cycle Repulsion Induction Motors
 ½ h. p. \$18.00 ¾ h. p. \$22.00 1 h. p. \$29.00 1½ h. p. \$38.00
 2 h. p. \$51.00. Liberal allowance on your old motor. Send us your inquiry for rebuilt motors. Every motor fully guaranteed for one year.

Power Switches—up to 4 h. p. \$1.00 7½ to 10 h. p. \$5.00
 15 to 20 h. p. \$9.50.

**NEMA ELECTRIC SUPPLY CO., 546 West Lake Street
 Chicago, Illinois**

SELECT *Inland* TOOLS

Radial drill, 6' American, triple purpose, motor driven thru 8 speed gear box.

Drill, No. 30 Natco mult. 12 spdl., m. d.
 Punch presses, 2, No. 5 Stoll o.b.i., b.g., m.d.
 Lathe, 14x6 American grd. head, m. d.
 Automatic, No. OOG Brown & S., m. d.
 Engine lathe, 24"x12" Lodge & S., q. c. g.
 Automatics, Cleve., ½", ¾", 1", 2" late ser.
 Milling machine, No. 2½ Rockford plain.
 Hack Saw, 6x6 Peerless, high speed.
 Saw, 6x6 Racine, shear cut, h. s. prod. m. d.
 Shaper, 16" Queen City, b. g.
 Screw machine, No. 3 Foster, w. f., p. f.,
 to carr. and tur., serial over 32,700.
 Screw mche., 1" cap., Millholland, hand.
 Planers, Pease, 20"x20"x5'; 24"x24"x6'.

Over 25 o.b.i. punch presses in stock.

We are always in the market to purchase your idle machinery. Single machines or complete plants.

**Inland Machinery Company
 41 So. Clinton St. Chicago**

COVERAGE...

More than 26,000 important buyers and users of machine tools depend on **The BLUE BOOK** every month for the latest developments and most advantageous offerings in the field.

That's why **The BLUE BOOK** produces maximum returns for advertisers—and at lowest rates in the field for comparable circulation.

HIGH GRADE MACHINE TOOLS

No. 32 GIDDINGS & LEWIS HOR. BOR. MILL.
 No. 55 TOLEDO PRESS—TIE ROD CONSTR.
 No. 4 BROWN & SHARPE UNIV. GRINDER.
 No. 2 DIAMOND SURFACE GRINDER.
 No. 70 HEALD INTERNAL GRINDER.
 36" DIAMOND FACE GRINDER.
 No. 24—53" GARDNER HORIZ. DISC GRINDER.

18" CINCINNATI AUTO. MILLING MACHINE.
 No. 3 KEMPSMITH UNIVERSAL MILLER.
 No. 13-B BROWN & SHARPE MILLER.
 No. 2-4-6 WARNER & S. TURRET LATHES.
 No. 3 THIEL DIE FILING MACHINE.
 No. 1 PRATT & W. GUN BARREL DRILL.
 No. 3—12 BARBER COLMAN GEAR HOBBSERS.

Indianapolis Machinery & Supply Co., Inc.
1959-69 SOUTH MERIDIAN STREET INDIANAPOLIS, INDIANA

Good Used Machinery

AIR COMPRESSORS; Curtis 9x9 dbl. cyl. vert.; 12x12 horiz. (Bury).
BORING MILLS; Niles 36" c. d. Baush 44" m. d. N-B-P 54" s. p. d. Vert. with 2 heads; Barrett 5" bar c. d. horizontal; Bullard 51" Vertical 2 heads; Colburn 60" vertical. 2 heads.
BRAKES; D & K 10' 10 GA. M. D. & D & K 10' 16 GA. Hand.
CUT-OFF MACHINE, Davis 6" cap. (3).
DRILLS (RADIAL); Mueller 2½', Fosdick 2½', Prent. 3'; Carlton 4' all gear box dr.; Hammond 4' sensitive; Amer. 2½" M. D.
DRILLS (H. S. B. B.); H & W 2, 4, 5-sp.; Allen 2 & 6-sp.; Avey, Demco, Lel-Giff. 1-sp.
DRILLS (MISC.); Baker No. 217 (2) & No. 314 Hvy. Duty; Hamilton 42" S.H.; Barnes 26" S.H. tap. attach.; Barnes 20" & 24" 1-sp. & 20" 4-sp. & 24" 3-sp. all grd. camel back; P & W No. 12 Multi-Sp.
GEAR CUTTERS; G & E 36", G & E 48", G & E 60" & B & S 26" s. p. d. automatic spur; Fellows 36" gear shaper. Cincinnati 36" gear cutter.
GRINDERS; P & W 12" vert. surf.; Cin. No. 1½ & B & S No. 12 univ. tool, B & S Nos. 11 & 16 plain, Heald Nos. 60 & 65 Int.; B & S No. 13 Univ. & Tool; Landis 10x30" Plain; B & S 10x48"; 4—Norton 6x32" plain, Heald No. 20 Rotary Surface (3). B & S No. 2 Univ.; Diamond No. 2 surface; Badger No. 220, auto. d.e., opposed disc (4); Webster & Perks No. 2 Univ.
HONING MACH.; Hutto 2-spindle Vert. M. D.
KEYSEATER; Mitts & Merrill No. 5 vert.
LATHES; Reed-Prent. 16"x8' grd. hd.; LeBlond 18x8'; Lehmann 18"x9'; Amer. 22x8'; Whit. Blais. 22"x8'; Davis 22"x10'; L & S 20"x10'; S-B & E 20"x10' q. c. g.; Flather 22"x10', Pittsburgh 40"x18' q. c. g.
MILLING MACHINES; Van Norman No. 2 duplex; Ohio No. 29 Univ.; Kemp No. 3; B & S No. 3; Cleve. No. 1 s. p. d. univ.; B. & S. No. 2; Amer. No. 1½; Cin. No. 3; B & S No. 3; Hendey No. 3; LeBlond No. 3; Mil. No. 3-B & Cinc. No. 3 s. p. d. pl.; Becker Model "B" & No. 6 vert.; Kemp. No. 33 s. p. d. Prod.; Ingersoll slab, m. d. 33", table 30½"x16".
PIPE MACHINES; Landis 12" A.C., m.d.; Landis 2" m.d.
PLANERS; Gray 30"x30"x10' 2 heads; Flather 24"x24"x6'; Gray 28"x28"x6' 1-hd.
PUNCH PRESSES; Bliss No. 19 o. b. i.; Toledo No. 3 o.b.i.; Federal Nos. 1, 2, 3 and 4 o.b.i.; R. & K. No. 3 o.b.i.; Bliss No. 62 geared; Ferracute No. P-4, Bliss No. 65-N, 68-N dble. action; Toledo No. 52 arch; Fer. No. EGF 52 Coining; Swaine No. 33; Niagara No. 4½; Willard No. 4-A o.b.i.; Swaine No. 38 arch, geared.
SAWS (HACK); Racine 6x6" H. S. (4); Peerless 6x6" M. D. Univ. Shaping (2).
SHAPERS; S & M, G & E, Ohio, Mil., Q. City, Davis, Cin. 16"; Ohio & G & E 20"; S & M, Q. City, Rock, 24"; Ohio 26"; Cin. 24" s. p. gr. box; Rhodes 3½" Vertical; American 24" heavy, b.g.
SCREW MACHINES; W & S No. 6 Hand; Nat. Acme. Nos. 515, 52, 55, & 56 4-sp.; Gridley 4-sp. 7½" & 4-sp. 1¼" cap.; Automatic, B & S No. 00 auto.
TAPPING MACHINES; (2) Garvin No. 2 Vertical Automatic & Garvin No. 1.
THREAD MILLER; Moline No. 10; Lees-Bradner No. 4 & No. 3. (2).
TURRET LATHE; Bullard 36" vertical, rapid production.

Above is only small part of our large stock on hand.

McDONALD MACHINERY CO.
 1531-35 No. Broadway ST. LOUIS, MO.

No. 4B KEARNEY & TRECKER PLAIN MILLING MACHINE, double over-arm, motor-in-base, with power feed rotary table, 99% new.
Automatics, Nos. 0, 00G B. & S. $\frac{1}{8}$ " Cleveland 4 spindle Model M.
Bolt Threader, $1\frac{1}{2}$ " Landis, M. D. with lead screw.
Broach, No. 3XA Oilgr., hyd., M. D.
Die Filers, No. 5 Thiel, M. D. sawing attachment.
Drill Presses, Single Spdl. 20" to 28"; 2 spdl. Allen; 3 spdl. Leland-Gifford B. B., M. D. power feed on each spindle 12" overhang No. 4 taper;

4 sp. Aveymatic; Leland-Gifford.
Grinders, Disc: Nos. 4 and 6 Gardner; 26" Badger, B. B. Surface; No. 2 Reid; No. 3 Abrasive, M. D.
Hack Saws, 6"x6" Peerless; 6"x6" & 9"x9" Racine.
Ironworker, No. $\frac{1}{2}$ Buffalo, M. D.
Lathes, 12", 14", 16", 18" Hendey, grd. hd., Motor Drive.
 All makes & sizes to 44"x16".
Milling Mchs., 5" P. & W. Automatic; No. 20 Van Norman Duplex; Pl. and Universal No. 1 to 3.
 No. 4 Cincinnati Vertical, S. P. D.

Nibbler, Nos. 1 and 1B Campbell.
Planers, 42"x42"x14" Hamilton.
Presses, 3C Bliss Tie Rod, 36"x72" bed, 6" str., dbl. crank; No. 1 Bliss cam drawing; No. 74 $\frac{1}{2}$ Bliss S. S. All sizes inclinable and horn presses.
Punch & Shear, Nos. 53, 55 Beloit.
Radial Drill, 3" Bickford Motor Drive.
Screw Machines, No. 4 Warner & S. Universal and Plain.
Shapers, 16—28" G. & E., Milw., etc.
Shears, 3" Niagara 10 gauge.
Welders, 200 Amp. USL arc; 5—25 K. W. Spot; 15 K. V. A. Butt.

VICTOR MACHINERY COMPANY, 130-132 S. Clinton St., CHICAGO, ILLINOIS

JONES OFFERS

LATHES

14x10" American Grd. Hd., M. D.
 16x8" Monarch Geared Hd., M. D.
 18x10" Boye & Emmes Cone Dr.
 30x12" Boye & Emmes Cone Dr.
 36x14" American Triple Geared.
 No. 2A Warner & S. Univ. Turret.

SHAPERS

20" Kelley, Motor Dr., Gear Box.
 16, 20 & 24" G. & E. Cone Drive.

MILLERS

No. 2B B & S Plain S. P. Drive.
 No. 2B Milwaukee dbl. overarm.
 No. 4 LeBlond Plain, Cone Drive.

PRESSES

No. 7-A Niagara Back Grd. Incl.
 No. 4 Rockford Back Geared Incl.
 No. 3, 4, 5 & 6 Toledo Inclinable.
 Toledo Nos. 90C & 92C dbl. crk.
 Ferracute, Double Crank, Gap.
 Horning Presses—all sizes.

SHEARS

83"x $\frac{3}{8}$ " L. & A. 10" gap.
 66"x $\frac{3}{4}$ " L. & A. 6" gap.
 96"x10 Gauge Robinson.
 72"x14 Gauge Robinson.
 72"x14 Gauge Niagara.
 Nibbler—Gray $\frac{3}{8}$ " cap.

MISCELLANEOUS

Boring Mill Horiz. 3" bar Lambert.
 Saws—9x9 Peerless M. D.
 3' and 4' Radial Drill.

THE JONES MACHINE TOOL CO., FRONT & PIKE STREETS, CINCINNATI, OHIO

REBUILT - IMMEDIATE DELIVERY

No. 4-G LeBlond Plain Miller, S. P. D.
 No. 3-B Milwaukee Universal Miller full equipment and vertical attachment, S. P. D.
 No. 3 LeBlond plain miller, cone.
 No. 2-A Garvin universal miller, cone.
 24" Gould & Eberhardt Shaper, cone.
 16" American shaper, cone.
 4 $\frac{1}{2}$ " Morris Radial, gear box.
 3 $\frac{1}{2}$ " American radial, gear box.
 No. 1 Hoosier Heavy Duty Drill, M. D.

24"x10" swings 27 $\frac{1}{2}$ " Greaves-Klusman heavy duty Lathe, 20" 4 Jaw chuck cone.
 21"x12" LeBlond Lathe, cone.
 14"x6" Hendey Lathe, cone.
 12"x72" Landis Plain Grinder.
 No. 11 B. & S. plain grinder.
 14" Pratt & Whitney surface grinder.
 3-Spindle Leland-Gifford Drill, with tapping heads, pump and piping, No. 2 M. T.
 No. 1-B and No. 2-B Edlund 2 spindle Drills.

IROQUOIS MACHINERY CO., 660 Ohio St., Buffalo, N. Y.

NEW 3 Phase Motors 1 to 20 H. P., 5 H. P. \$55.75

DRILLS

25 Plain 20" Upright.
 4 Excelsior Sensitive Type.
 24" Sliding Head Back Geared, Cincinnati.
 28" Hoefler Sliding Head Back Geared, Power Fd.
 New 32" Sliding Hd., Pwr. Fd., Back Grd. Hoefler.

New 4-spindle Demco Hi-speed.
 1—Henry & Wright Hi-speed.
 4-spindle Foote Burt Heavy Duty.
 Bausch Multiple Spindle.
 6 spindle Sensitive.

LATHES

16"x8" Hendey.
 16"x5" Geared Head Monarch, motor drive.
 20"x10" Bradford.

24"x10" LeBlond, extra heavy duty.
 24"x24" Prentice.

MISCELLANEOUS

16" Back Geared Ohio Shaper.
 3, Gray Planers.
 24"x20"x6" Ingersoll Millers.

Several brand new Marquette No. 300 welders with regular equipment at greatly reduced prices.

THE OSBORNE & SEXTON MCHY. CO., Dept. H. COLUMBUS, OHIO

GUARANTEED USED MACHINERY

Air Compressor, 6x6 Curtis dbl. cyl.
Bar cutter, No. 8 Buffalo, LIKE NEW.
Borer, cylinder, No. 5-D Moline, 6 sp.
Boring mill, 51" Niles vertical, 2 heads.
Broaching mch., V-1 American, 2-ton capacity.

Bulldozer, No. 7 Ajax.
Drill, 24" Barnes, 5 spindle, self-oiling.
Drill press, 4 spindle No. 2 Avey.
Drill, radial, 4" Cincinnati-Bickford.
Drill radial, 51" American triple purpose.
Grinder, No. 10 Besley double disc.
Grinder, 18" Diamond face.
Grinder, No. 3 Abrasive surface.
Grinder, No. 33 Abrasive surface, vert.
Hobber, No. 3 Barber-Colman.
Honer, No. 212 Barnes.
Lathe, 26"x12" Ryerson grd. head m. d.
Miller, Type "C" Becker, rotary table.
Miller, No. 2B K. & T. pl. complete.

Miller, No. 13-B B. & S.
Miller, No. 1 Kempmth univ.
Miller, No. 2 Kemps. pl. maxi. m. d.
Nibbler, 30" throat, 1/8" capacity Gray, motor drive.
Planer, 30"x30x10" Cleveland open-side.
Planer, Cleveland 48x48x12 openside, factory rebuilt.
Press, No. 1, 2 and 3 Consolidated.
Press, No. 5 Bliss solid back, m. d.
Press, No. 5 Cons. 2 crks., 1" & 3" str.
Screw machine, No. 4 W. & S.
Shaper, 20" S. & M., m. d.
Shaper, 20" American s. p. d.
Shaper, 16" American, s. p. d.
Shear, 10' 3/16" Niagara.
Turret lathe, No. 5 Foster universal.
Turret lathe, No. 1-B Foster.
Turret lathe, 18" Libby, heavy duty.

Many other exceptional offerings. Send us your inquiries.

All machines backed by Essley guarantee

THE E. L. ESSLEY MACHINERY CO.
831 W. EVERGREEN AVE., CHICAGO, ILL.

REASONABLY PRICED TOOLS

PRESS, No. 305 Bliss, straight side, back geared, steel tied frame, 5" stroke.

AUTOMATICS, Several Model A Clevelands, from 3/4" to 3 3/4" bar capacity.

BOLT CUTTER, 1 1/4" Acme single, class A; 2" Landis.

DRILLS, 36" Cincinnati back geared, sliding head, tapping attachment.

24" Edlund Production 1 1/4" cap. power feed; No. 12 Minster H. D.;

2—Spindle 20" Barnes All Geared Self Oiling M. D., 24" Barnes all geared.

3—Spindle 20" Barnes All Geared Self Oiling belt drive; No. 314 Baker heavy.

GRINDERS, 14"x72" Norton Plain; 12"x72" Landis M. D.; No. 78 Wilmarth & Morman Surface M. D.; 10"x36" Norton.

LATHES, 38"x14" Fifeild—Cheap.

18"x8" Greaves-Klusman double b. g., quick change.

MILLERS, No. 2B Brown & Sharpe plain, single pulley drive; No. 6 Becker Vertical with ball bearing countershaft; No. 3 Milwaukee Plain, Timken Bearings, Vertical Head, Rapid Traverse, Motor in Base; No. 1/2 Van Norman, 8" P & W Automatic. No. 1 Kempmth plain; No. 1 1/2 Cincinnati plain; No. 13 Garvin, index centers.

PLANERS, 30"x30x8" Cincinnati, two heads on rail; 36"x15" Betts, 2 heads.

PRESSES, O. B. I.—No. 105 Bliss Consolidated, dbl. crk. incl., flywh. type, arr. for motor. No. 2 Rockford 3" stroke; No. 3 and 4 Walsh; No. 2 1/2 Robinson.

RADIAL DRILL, 3" Prentice, gear box drive; 3" Cincinnati Bickford gr. box drive.

SCREW MACHINES, No. 4 Warner & Swasey univ. cone head, also plain screw machine. No. 1 Brown & Sharpe wire feed; No. 4 Milholland.

Many other tools—exceptional "buys"—write for full details.

A. D. White Mchy. Co., 108 N. Jefferson St., Chicago, Ill.

LIQUIDATION

of all Machinery, Bldgs., Land, Small Tools, Motors, and misc. equipment of
ANDERSON DIESEL ENGINE COMPANY **ANDERSON, INDIANA**

BORING MACHINES

- 52" King Vert. Mill, 2 swivel Heads Power Rapid Traverse.
 30" Gisholt Vertical Mill, 1 swivel Turret Head, Power Rapid Traverse.
 3A Univ. Hori. Mill, 3" Bar, 24x48" Table.
 3A Univ. Hori. Mill, 3" Bar, 24x60" Table.
 5" Barrett Hori. Bar. 28" Bar. Q. C. Geared speeds & feeds, 4 x 12" Aux. Table.
 5" Barret Horizontal Bar, 12" Bar.
 72" Bickford Open Side Vert. Boring mill 2 Heads on rail. 1 side head, 72" table.

PLANERS

- 48x48x20" Liberty Openside, 2 Heads on rail, 1 side head, 72" Max. reach of rail, Box table. Power Rapid Trav. Direct Motor Drive. 2 Motors.
 45x36x18" Liberty, 4 Heads, Box Table, Direct Motor Drive, 2 Motors.
 24x24x6" Gray, 1 Head on rail.

LATHES

- 27x12" LeBlond Geared Head Timken Bearing, 16 speed, M. D. (2)
 25"x16" LeBlond Q. C. G. Heavy Duty Dble. B. G., chuck & equipment.
 34"x15" Greaves-Klueman Q. C. G. Heavy duty. Dble. B. G., chuck & equipment.
 24"x9" Chard Q. C. G. Dble. B. G. chuck & equip.
 20"x8" Bradford Double B. G., Pl. C. G., Taper Attachment, Chuck.
 18"x8" Chard, Q. C. G. Double B. G.
 16"x6" Chard, Q. C. G. Double B. G. Taper Att. chuck, collets.
 16"x8" Muller, Pl. C. G.
 15"x6" Carroll & J. Q. C. G. chuck, collets.
 16"x6" LeBlond Rapid Production.
 12"x14" Conover & Overkamp Grd. Hd. Production.

FORGE SHOP

- Hackey Power Hammer.
 No. 33 Bertach Hd. Shear.
 Long & Alstatter Power Punches 20" Gap.
 4" Curtis & Curtis Pipe Threading Machine.
 Leeds & Northrup Electric Furnace.
 Gas Furnaces, Blacksmith tools, Blowers, & Misc. Equipment.

A. C. GENERATORS

- 168 K. W. 240 V. 60 C. 3 Ph. 257 RPM. G. E. Belt Driven exciter, complete with panelboards.
 150 K. W. 240 V. 60-3 257 RPM. Western Elect. mtr. dr. exciter, mounted on shaft panel board.
 125 K. V. A. 240 V. 60-3, 257 RPM Burke V-belt driven exciter with switchboard.
 50 K. V. A. 240 V. 60-3 120 Amp. 1200 RPM dir. con. exciter, switchboard, 144 K. W. 240-60-3 800 RPM G. E.

D. C. GENERATORS

- 10 K. W. 125 V. 160 Amp. 1450 RPM Westinghouse.
 3½ K. W. 125 V. G. E. 1800 RPM Direct connected to G. E. 50 H. P. 220/60/3 1740 RPM Motor.

- 300 Amp. 240 V. G. E. with complete switchboard.
 7½ K. W. 125 V. 1400 RPM Fairbanks—Morse.

A. C. MOTORS

- 100 H. P., G. E. Syn. motor, 300 RPM 2300 V. 60-3 split rotor. Engine type for dir. shaft mounting, with G. E. control panel board.
 25 Motors 1 H. P. to 30 H. P.

DIESEL ENGINE & GENERATOR

- 225 HP. Type K. 14x18 Anderson Semi-Diesel 4 Cy. Eng. dir. connected to 168 K. W. G. E., 240/60/3 257 RPM Gen. Belt Driven exciter with panel and switchboard.

TURRET LATHES

- No. 4 W. & S. Univ., Wire Feed, collets, Box Tools.
 No. 2A W. & S. Universal 3½" Hole in spindle, Bar & chucking, large asst. collets, Box Tools.
 No. 3A W. & S. Universal, 4½" Hole in spindle, Bar & chucking, large asst. collets, Box Tools.

MILLING MACHINES

- No. 2 B. & S. Univ., cone, Dividing head, and tailstock, Vert. Hd. Vise, arbors, chuck, complete.
 No. 3B Milw. Plain, S. P. D. Dble. Overarm, Vise.
 No. 3B Milw. Univ., S. P. D. Dble. Overarm, Div. Head & Tailstock, chuck, vise, arbor, complete.
 Vertical Head for above machines.
 No. 3 Cincinnati Plain, Cone, Equipped with Div. Head, and Tailstock, vise, arbor.

RADIAL DRILLS

- 2" Fosdick, Tapp. Att. S. P. D. thru gear box, 8½" round column.
 3½" Fosdick, Hvy. Duty, Tapp. Att. S. P. D. thru gear box, 10" round column.
 4" Fosdick, Hvy. Duty, Tapp. Att. 12" rd. column, M. D. thru gear box.
 4" American Triple Purpose, Enclosed Hd. S. P. D. thru gear box, tapping attachment.
 5" Fosdick Hvy. Duty, Tapp. Att. S. P. D. thru gear box, 14" round column.
 5" Fosdick Hvy. Duty, Arm lengthened to 6', 14" round column, Tapp. Att. M. D. thru gear box.

MISCELLANEOUS

- No. 3 M. & M. Keyseater 50 cutters.
 No. 5 Marvel H. S. Hack Saw, M. D. Auto. Cut Off.
 6x6 Racine Hack Saw.
 12x44 Cincinnati Plain Grinder.
 B. & S. Planer Type Surface Grinder.
 14x44 Table, 8x18 Magnetic chuck.
 No. 1 LeBlond Univ. Tool & Cutt. Grinder, all att.
 No. 2 B. & S. Surface Grinder, Magnetic Chuck.
 20" Barnes Style D-4 spindle Drill, sliding heads, 1 spindle arr. with tapping attachment.
 22" Wiegell Drill Press, enclosed head, Tapp. Att.
 No. 1 Knight Vert. Milling and Drilling Machine.
 20" Wiegell Plain Drill Press.
 Toledo No. 1000M M. D. Pipe Threader & Cut Off Machine.
 14" Hill-Clarke Shaper, cone.
 \$20,000 Small Tools and Shop Equipment.

CAN BE INSPECTED UNDER POWER.

Wire—Phone—Write.

Address all communications to

Wm. Hanzel, LIQUIDATOR,
Box 31. Phone Anderson 53. Anderson, Indiana
 Anderson, Indiana, located 38 miles from Indianapolis, Ind.

Advertisers Index

Aaron Machinery Co.	149	Ertel Machine Company	
Abart Gear & Machine Co.	111	Esley Machinery Co., E. L.	175
Acme Industrial Co.	81	Etico Tool Co.	12
Air-Way Pump & Equipment Co.	103	Ex-Cell-O Corporation	13, 82
All Steel Welded Truck Corps.	61		
American Rotary Tools Co.	118	Failor-Strafer Machinery Co.	152
American Tool Works		Falk Mill Supply Co., Inc.	164
Anderson Bros. Mfg. Co.	86	Fameo Machine Co.	59
Anderson Diesel Engine Co.	176	Federal Press Co.	77
Armgo Company	108	Federal Products Corporation	76
Armstrong-Blum Mfg. Co.	Inside Front Cover	Flynn Manufacturing Co.	
Armstrong-Bray & Co.	111	Ford Mfg. Co., M. A.	8
Armstrong Bros. Tool Co.	36	Ford Motor Co., Johansson Division	114
Atlantic Gear Works	180		
Atlas Press Co.	22	Galland-Henning Mfg. Co.	96
Ayer Mfg. Co., F. H.		Gallmeyer & Livingston Co.	95
		General Blower Co.	152
Baldor Electric Co.	135	General Machinery Corp.	154
Baumbach Mfg. Co., E. A.	110	Gilmore Machinery Co.	149
Beal & Co.	151	Goldsher Machinery Co.	80
Belyea Company	155	Gorton Machine Co., Geo.	120
Bennett-Rafkin Machine Tool Corp.	160	Grant Mfg. & Machine Co.	108
Berkeley Engineering Co.	51	Greenard Arbor Press Co.	108
Bernstein & Co., Geo. M.	158	Grob Brothers	
Beverly Shear Co.	72	Grobet File Corporation	131
Black Diamond Saw & Machine Works, Inc.			
Blank Machinery Co., John	52	Hackett Co., J. Lee	155
Bleser Mfg. & Mch. Co.	155	Hamilton Mfg. Co.	127
Bradley Machinery Co.	170	Hamilton Tool Co.	97
Breuer Electric Co.	109	Hanna Engineering Works	3
Brewster & Co.	120	Hannifin Manufacturing Co.	1
Bridgeport Pattern & Model Works		Hanzel, William	176
Broadway Machinery Co., Inc.	170	Hardinge Brothers, Inc.	Front Cover 4
Brown Machinery Co.	154	Hartford Special Machinery Co.	106
Brown & Sharpe Mfg. Co.	49	Harvey Mfg. Co.	131
Buffalo Forge Co.	10	Haskins Co., R. G.	16, 21
Burke Machine Tool Co.	118	Hill-Clarke Machinery Co.	161
Burr & Son, J. T.	64	Hobart Brothers	92
Busch Co., J. C.	136	Hotel Auditorium	112
		Hotel Sterling	104
Caney-Otto Mfg. Co.	97	Hotels Madison and Lenox	123
Carlson Mfg. Co., C. H.	72	Hovis Screw Lock Company	108
Carroll & Son, Wm.	94	Hyman & Sons, Joseph	155
Cerro de Pasco Copper Corp.			
Challenge Machinery Co.	32	Indianapolis Machinery & Supply Co.	172
Chicago Electric Co.	162	Industrial Machinery Co.	155
Chicago Rivet & Machine Co.	88	Industrial Plants Corp.	157
Chicago Tool & Engineering Co.	63	Inland Machinery Company	172
Chicago Wheel & Mfg. Co.	90, 91	Interior Steel Equipment Co.	30
Cincinnati Machinery & Supply Co.	163	Interstate Machinery Co.	167
Clinton Machinery Co.	158	Iroquois Machinery Co.	174
Colonial Bushings Co.	105		
Colwell, S. G.		Janette Mfg. Co.	85
Comet Tools, Inc.	95	Jarvis Co., Charles E.	11
Congress Tool & Die Co., Inc.	6	Johnson & Sons Machinery Co., Wm. C.	164
Conway Clutch Co.	20	Jones Machine Tool Co., Cincinnati	174
Cullman Wheel Co.	Back Cover		
		Kearney & Trecker Corp.	
Dayton Rogers Mfg. Co.	94, 112	Klauber Machinery Co.	153
Delta Mfg. Co.	34		
Detroit Tap & Tool Co.	105	L-W Chuck Co.	89
DeWitt Tool Co.	170	Lang Machinery Co.	150
Dreis & Krump Mfg. Co.		Lewthwaite Machine Co.	98
Dremel Mfg. Co.	179	Lincoln Electric Co.	47
Duro Metal Products Co.	19	Littell Machine Co., F. J.	123
		Lovejoy Flexible Coupling Co.	84
Eastern Machinery Co.	169	Luna Electric Equipment Co.	124
Economy Machine Products Co.	64		
Eisler Engineering Co., Inc.	129	M-B Products	126
Electro-Matic Products Co.	68	McDonald Machinery Co.	173
Ermerman, Louis E.	155	Machinists Tool Grinding Co.	130
Errington Mechanical Laboratory	113	Mall Tool Company	23
		Marr-Galbreath Machinery Co.	152

Advertisers Index

Marshalltown Mfg. Co.	93	Schmidt, Geo. T., Inc.	99
Maxwell Company, F. A.	60	Scott-Bansbach Machinery Co.	153
Metal Carbides Corp.	117	Segal Machinery Co.	154
Meylan, A. R. & J. E.	62	Sellstrom Mfg. Co.	62
Michigan Chrome Co.	106	Seneca Falls Machine Co.	109
Midwest Equipment Co.	162	Service Co.	153
Miles Machinery Co.	165	Severance Tool & Mfg. Co.	103
Modern Collet & Machine Co.		Sheldon Machine Co.	128
Modern Machine Corporation	130	Simmons Machine Tool Corporation	162
Modern Machine Tool Co.	67	Sjogren Mfg. Co.	5
Modern Machinery Co.	151	Skilaw, Inc.	7
Morey Machinery Co., Inc.	159	South Bend Lathe Works	107
Morris Machinery Co.	168	Stackbin Corp.	133
Morrison Machine Products, Inc.		Standard Gage Co., Inc.	35
Motor Tool Mfg. Co.	124	Standard Machinery Co.	155
		Standard Pressed Steel Co.	
National Acm Co.	45	Stanley Electric Tool Division	24
National Machine Tool Co.		Starrett Co., L. S.	55
Nedco Company	120	Steege Machinery Co.	116
Nelson Machinery Co.	154	Sterling Products Co.	107
Nema Electric Supply Co.	172	Strand & Co., N. A.	15
Nicholson & Co., W. H.	52	Strippit Corporation	116
Norgren Co., C. A.		Strong, Carlisle & Hammond Co.	160
Norton-Broadway Machinery Co.	150, 168	Sturdimatic Tool Co.	122
Nutmeg State Machinery Corporation	155	Sun Machinery Co.	166
		Sundstrand Machine Tool Co.	38
O'Brien Machinery Co.	164	Superior Mfg. Co.	150
Odin Universal Corporation	56	Surplus Material & Machinery Co.	154
Oliver Instrument Co.	96	Surplus Stock & Machinery Co., Inc.	150
Oliver Machinery Co.		Sutton Tool Co.	14
Osborne & Sexton Machinery Co.	174		
Ott Machinery Sales, Inc.	166	Tannewitz Works	106
		Taylor Machine Co.	110
Pasman Brothers	170	Timesaver Products Co.	65
Pedrick Tool & Machine Co.	100	Tomkins-Johnson Co.	132
Pier Equipment Co.	102	Travers Tool Co.	168
Plunkett Machine Co.	74	Tree Tool and Die Works	121
Powermaster	62	Triplex Screw Co.	119
Pratt & Whitney	9	Troyke, Alfred H.	
Precision Tool Co.	75	Turner Uni-Drive Company	26
Prints Electric Co.	122		
Proemier Safety Chuck Co.	25	United Machinery & Supply Co.	150
Prosser & Son	115	Used and Rebuilt Machinery	149-176
Pruitt Machinery Co.	152		
Putnam Tool Co.		Verson Allsteel Press Co.	73
		Victor Machinery Co.	174
Quality Tool & Die Co.	134	Victor Machinery Exchange	171
		Vimco Mfg. Co.	79
R & L Tools	31	Vine, R. A.	149
Racine Tool & Machine Co.	125	Vonnegut Moulder Corporation	113
Reich Mfg. Co., J. R.			
Reliance Machinery Sales Co.	154	Walls Sales Corporation	94
Remco Products Corporation	56	Walton Co.	104
Renn Tool Co.	66	Ward Machinery Company	Inside Back Cover
Reynolds Machinery	166	Wardwell Mfg. Co.	128
Ridge Tool Co.	18	Wells Mfg. Corp.	29
Rigid Tool Holder Co.	84	Wertman Machinery Co.	154
Rivett Lathe & Grinder, Inc.	2	West Penn Machinery Co.	151
Rogers & Co., Samuel C.	74	Western Tool & Mfg. Co.	92
Rogers Mfg. Co., Dayton	94, 112	White Machinery Co., A. D.	175
Rosenkrantz, Weisbecker & Co.	149	Whitney Metal Tool Co.	17
Ross Co., David J.	83	Wigglesworth Machinery Co.	149
Ross Operating Valve Co.	53	Wiley's Carbide Tool Co.	69
Royal Machinery Exchange	152	Wilson, K. R.	33
Russell Boring Bar Co.	124	Wittek Manufacturing Co.	101
Russell Machine Co.	153	Wrought Washer Mfg. Co.	78
Ruthman Machinery Co.	126	Wysenbeck & Staff, Inc.	28
Safety Socket Screw Corp.	27	Yohs Supply Co., Wm. S.	80
Schaner Machine Co.	100	Yost Mfg. Co.	116
Scherr Co., George	180		
		Ziegler Tool Co.	87

MOTO-TOOL

Proves a
time-saver

**on hundreds
of jobs in a
thousand plants**

See how it speeds up your work

There's not another motor-in-hand tool like Moto-Tool, not another machine in its class that can match Moto-Tool in speed, power, ease of handling or in exclusive construction advantages. You can use Moto-Tool on practically any kind of a bench, laboratory, or shop operation—it handles over 200 instantly interchangeable accessories—and turn in less time on the job and better work. What's more, you can use Moto-Tool hour after hour, day after day without down time for cooling or time out for factory replacement of parts. It delivers the right speed and power for successful grinding that adds extra life to emery wheel points and does a beautiful job of routing on practically any material.

Consider These Exclusive Moto-Tool Features

- Speed of about 27,000 r. p. m. for better grinding, polishing, cutting.
- Natural, vibrationless finger grip that does not tire the hand
- Patented chuck lock pin for wrenchless, simple, instant release or insertion of accessories.
- Shock proof 100% Bakelite housing for absolute safety.
- Advanced cooling system for greater working comfort.
- Removable air cleaner for long trouble-free motor service.
- Improved armature shaft and bearings for greater durability.
- Twin cone type collet for faster, tighter chuck grip.
- Easily interchangeable brushes require no shipment to factory.

Moto-Tool plugs in anywhere. Runs on A. C. or D. C. current. Delivers plenty of power for tough pulling—and perfect vibrationless balance for exacting precision work. Every Moto-Tool part is thoroughly tested and accurately balanced to provide hour after hour of trouble-free operation under any and every working condition. Try this 13 oz. general utility tool for 10 days on your work. Convince yourself, as thousands have in large and small plants everywhere. If you are not completely satisfied your money will be promptly refunded. Leading supply houses carry them—or order direct. Send Quickmail Coupon No. 28 for free, illustrated data bulletin. Write today.

DREMEL MANUFACTURING CO.
America's Exclusive Maker of Motor-in-Hand Tools

Mauser Precision Tools For Tool and Diemakers Use.

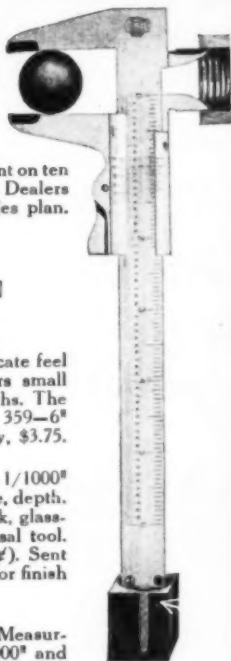
Every mechanic can afford the three Mauser tools illustrated below. Widely used in shops everywhere. Sent on ten days' money back offer. Order today. Dealers and shop agents, write for special sales plan.



Mauser depth gage permits more delicate feel and may be quickly adjusted. Enters small holes. Vernier measures in thousandths. The tool you've been waiting for. No. 359—6" capacity, \$4.75. No. 357—3" capacity, \$3.75.

Vernier Caliper No. 64—Measures in $1/1000^{\text{th}}$ and $1/128^{\text{th}}$ to $5 \frac{5}{16}^{\text{th}}$, outside, inside, depth. Chrome steel, quick-setting cam lock, glass-hard measuring surfaces. A universal tool. Only \$6.50. (Leather pocket case 50¢). Sent on approval and guaranteed for finish and superior accuracy.

Height Gage No. 407 R.—Measuring capacity $6 \frac{1}{4}^{\text{th}}$ in $1/1000^{\text{th}}$ and $1/128^{\text{th}}$. A beautifully finished precision tool. Costs \$14.00. Write for folder showing 14 ways this tool benefits employers and workers. Send Quickmail Coupon No. 45 for complete catalog of Mauser tools.



George Scherr Co.,

122 Lafayette St.,
New York, N. Y.

ATLANTIC GEARS

are made with the extra care and exactness which distinguishes the superior from the average product, regardless of quantity involved. In addition to our complete line of **STOCK GEARS** we make special gears of all types and sizes to specifications.

Get our quotations for comparison! Get our gears for satisfaction!

ATLANTIC GEAR WORKS, 200 LAFAYETTE STREET,
NEW YORK, N. Y.

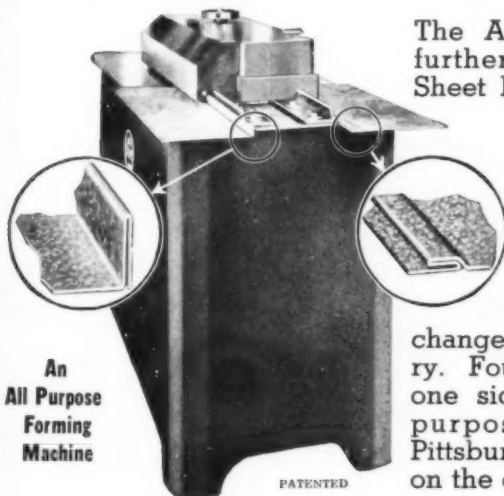
AGENTS IN PRINCIPAL CITIES—ASK FOR OUR STOCK GEAR CATALOG

— *Introducing* —

The New Almar-Universal Lock Forming Machine

MACHINE VALUE IS JUDGED ON QUALITY AND QUANTITY IT WILL PRODUCE

YOUR FIRST CONSIDERATION IS YOUR COST OF COMPLETED WORK



An
All Purpose
Forming
Machine

The Almar-Universal is a further advancement in Sheet Metal Working Machinery for it gives all-purpose, high speed forming on one machine using 18 gauge or lighter metal. Only slight adjustments for change-overs are necessary. Fourteen spindles on one side for general all-purpose forming with Pittsburgh lock forming on the other.

SELECT THE MACHINE
BEST SUITED TO YOUR REQUIRE-
MENTS. ALMAR CORNER LOCK
FORMING MACHINES MADE IN
THE FOLLOWING MODELS:

ALMAR JR. 22 GAUGE CAPACITY
ALMAR STANDARD 20 GAUGE CAPACITY
ALMAR HEAVY DUTY 16 GAUGE CAPACITY
ALMAR FLANGER 16 GAUGE CAPACITY

SPEED—EFFICIENCY—ECONOMY—DURABILITY

SEND QUICKMAIL COUPON NO. 14 FOR
PRICES—SAMPLES—SPECIFICATIONS



ONE MAN OPERATION

WARD MACHINERY COMPANY

MACHINES TOOLS SUPPLIES FOR SHEET METALS EXCLUSIVELY

564 W. WASHINGTON BOUL.

CHICAGO

ILLINOIS

Modernize

Your

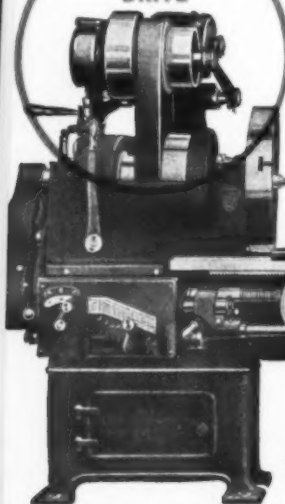
ATHES,
HAPERS,
MILLING
MACHINES,
PUNCH
PRESSES

with

CULLMAN
Drives

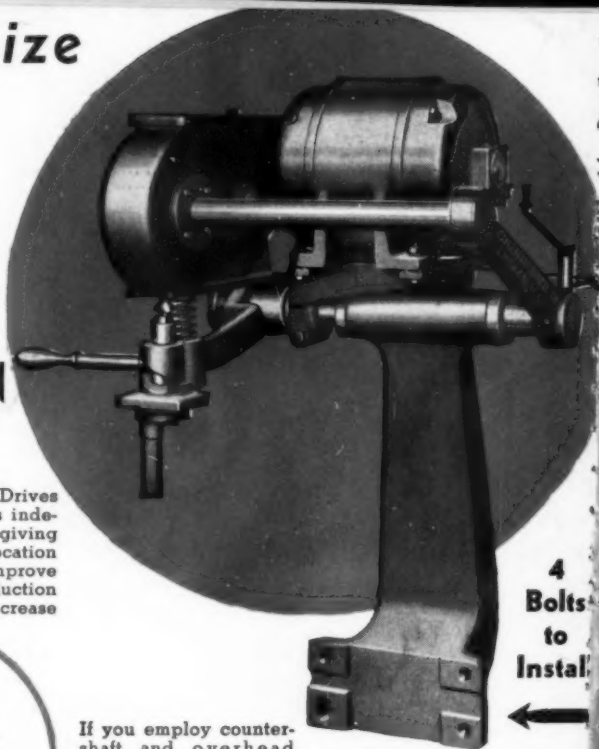
CULLMAN Individual Drives make your machine tools independent of line shafting, giving complete flexibility of location and operation — they improve efficiency, lower production costs, save floor space, increase safety.

**CULLMAN
LATHE
DRIVE**



If you employ counter-shaft and overhead belting arrangements on your cone pulley machines, you'll find it decidedly profitable to get all the facts on CULLMAN Drive. Savings quickly repay the reasonable cost.

**THE
CULLMAN
WHEEL CO.**



**4
Bolts
to
Install**

**60-DAY TRIAL
OFFER—**
Determine your own plan just what CULLMAN Drives will do for you. Send us the data machines to be equipped.

Quickmail Card No. 4 will bring full information.

1359 Altgeld Street, CHICAGO, ILLINOIS

